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ART. LI.—ON KALMIA LATIFOLIA. By R. H. STABLER, M.D.

*Nat. Ord.* ERICEÆ.

*Sex. Syst.* DECANDRIA Monogynia.

**KALMIA** Calyx five-parted. Corolla salver-form; border on the under side, producing ten cornute protuberances and as many cavities, in which the anthers are concealed.

Capsule five-celled, many-seeded; dissepiments margined.—*Beck.*

*K. latifolia.* Leaves on long petioles, scattered and ternate, oval, coriaceous, green on both sides; corymb terminal, viscidly pubescent.

Beck's Medical Jurisprudence, Vol. 2, p. 550, 673. Barton's Materia Medica, part 1, p. 18. Bigelow's Med. Botany, Vol. 1, p. 137, 139.

*Common names.* Laurel, Mountain Laurel, Broad-leaved Laurel, Bay, Calico Bush, Mountain Ivy.

Not officinal.

*Description.*—This is an indigenous shrub, having a root very irregularly branched, giving offsets immediately below the surface and shooting deep into the soil. The texture of both it and the stems, is very firm, and employed by the Indians in making various useful articles, such as spoons, trowels, &c. There are generally three principal stems to each plant. They are dichotomously branched, and vary in height from three to twenty feet; have a rough striated appearance imparted to them by the longitudinal splitting, and separation of the external layers of bark, and

a gray color. The leaves are on long petioles, scattered, ternate, oval and smooth on both sides. The flowers are arranged in terminal corymbs: the corolla wheel salverform, with ten horns beneath, and ten corresponding cavities within, containing the anthers until the pollen is mature. They are usually of a rose color, occasionally white. The calyx is five-parted, persistent, wheel form, and hypogynous. The stamens are ten in number, and inserted into the base of the corolla; anthers two-celled, the cells hard and dry. There is but one persistent style. The capsule is five-celled, five-valved, the valves alternating with the divisions of the calyx. Seed indefinite, minute, embryo cylindrical, in the axis of fleshy albumen, radical opposite the hilum.

*Habitat.*—This species of *Kalmia* is found throughout the United States, but is most abundant on hill sides and the banks of rivers and streams; it is also found in great abundance on the Alleghany mountains, which are rendered quite gay at the season of its flowering, by the large clusters of beautiful rose colored flowers contrasted with the rich green foliage. It begins to flower late in June, continuing in inflorescence about a month. The seeds do not ripen until late in the fall. Its handsome flowers and rich evergreen foliage, render it well worthy of cultivation as an ornamental plant. The most ready way of propagation, is by parting the roots late in the fall; if grown from the seed it does not flower until several years old. The situation best adapted to its habits is a shady border of light gravelly and rich soil.

*Medical History.*—The poisonous nature of the *Kalmia*, was probably familiar to the aborigenes, before we became acquainted with it. Dr. Barton says, a decoction of the leaves is used by the Delaware Indians, to poison themselves with. It is a prevailing opinion also, that sheep and cattle are occasionally poisoned by feeding on the leaves, but they are eaten with impunity by deer, goats and par-

tridges. The latter are considered poisonous, as food, during the winter and spring, from their feeding on the buds. The facts in support of this opinion are numerous, but the prescribed length of this article prohibits me from mentioning more than a few of them. Dr. Shoemaker, of Philadelphia, published in the North American Medical and Surgical Journal, two cases of poisoning occurring in the same family, from eating the flesh of partridges; the place where the bird was prepared for the spit, was examined and a number of the laurel leaves were found. This occurred in February, 1826. Dr. Mease has published several cases which occurred in the same city, during the years 1791 and 1792. Other cases are related by Dr. Hayward of Boston, and Dr. Comstock of Connecticut. It is well known that honey is occasionally poisonous, and, in our own country, the deleterious properties imparted to it, have been traced to the bees feeding on the flowers of this, and other poisonous plants, as the Andromeda, Agalea, Datura rhododendron, &c. Dr. Barton, states that a party of adventurers removed some hives of bees from Pennsylvania to New Jersey, in hopes that the savannas of the latter country might be favorable to their increase, and consequently to the making of honey; the Kalmia was the principal flowering plant in these situations; the bees increased prodigiously, but it was soon found that every one who ate of the honey became intoxicated in a high degree. He recommends that every fetid or poisonous vegetable should be removed from the habitation of these insects. In two cases recorded by Dr. Hosack, the honey was of a dark reddish color, and thicker consistence than is usually sold in the markets.

*Medical Properties.*—The leaves, which constitute the part used in medicine, are possessed of poisonous properties, but have been used with advantage in some cases of disease. Caution, should be used, however, in carefully regulating the dose. Dr. Thomas, in an inaugural dissertation, published in Philadelphia, A. D., 1802, states that a case of diarrhœa

of eight weeks duration, was cured by a decoction made by boiling one ounce of the leaves, in eight ounces of water, down to four ounces. Thirty drops were administered six times a day, but this quantity produced a vertigo, and the dose was afterwards repeated only four times daily. Dr Barton was informed that the leaves in powder were used by an empiric with success in certain states of fever. Externally applied in the shape of ointment or decoction, they have proved useful in various diseases of the skin, as tinea capitis, psora and herpes, but caution is necessary in its use for this purpose, as the author just quoted states that nervous symptoms have resulted from the application of the decoction. Dr. Bigelow has seen the recently powered leaves given in doses of twenty grains without perceptible effect.

The foregoing is all that I have been able to learn in regard to the properties of this plant by consulting various authors; but believing it possessed of medical virtues, which recommended it to more attention than it had yet received from the profession, I subjected it to the following experiments. The leaves were obtained, thoroughly dried and powdered. A dose of ten grains produced no effect; at the end of two hours I took forty grains more; but in neither case could the least change be perceived from the natural state of health. At another time, one ounce of the fresh leaves was boiled for a few minutes in a pint of water, and set aside in a covered vessel for several hours; the liquid was then decanted. A large dose of this preparation had no perceptible effect for half an hour; dimness of sight with apparent increase in the size of objects, and vertigo then came on. Afraid of allowing the effects to proceed too far, a teaspoonful of the flower of mustard was mixed in a little water and taken, with the effect of evacuating the stomach, but sufficient had already entered the circulation to produce very alarming symptoms; these were, extreme depression of the arterial action, cold extremities and blindness, following each other very rapidly; but it was remarkable that no



disorder of the intellect occurred, or any nervous symptoms that might not be readily accounted for by the extreme sedation; nor was anything observed in its mode of action that would lead us to consider it possessed of acrid properties. The effects of the Kalmia on the human system in health, hence appear to be those of an arterial sedative, unpossessed of the irritant or narcotic properties of others in the same class. It would seem well suited to moderate the action of the heart in hypertrophy, and other derangements of that organ, where repeated bleeding exhausts the patient and affords but temporary relief. The astringency imparted by the tannin it contains, combined with the sedative action on the heart and arteries, recommend it as a remedy in hemorrhages, diarrhœa, and dysentery. It is obviously indicated in all inflammatory affections; and in fevers where the grade of action is above the healthy standard. The fruit is possessed of similar properties with the leaves, and more astringency. "It is probable that other species of Kalmia—as the Kalmia angustifolia, or sheep-laurel, and the K. glauca, or swamp-laurel, have properties identical with those of the K. latifolia." The decoction used by Dr. Thomas is an ineligible preparation. The infusion or tincture would possess the active properties of the remedy in a much more uniform degree. The following would probably be a convenient mode of administering it.

R. Fol. Kalmiæ,	ʒij.
Alcoholis,	Oj.

Macerate for seven days and strain. The dose for an adult would be thirty drops, every two or three hours.

*Chemical Analysis.*—The dried leaves were infused in cold water and strained. It then gave copious precipitates, with alcohol and solution of sub-acetate of lead. The sesqui-salts of iron gave a precipitate of a greenish black color. Alcoholic and ethereal tinctures were of a deep green color; on adding water to one of them all the green color-

ing substance was precipitated, leaving the liquid of a light yellow color, on adding ammonia to this, after separating it from the precipitate, the color was changed to brown; an acid restored the original tint. The fresh leaves were subjected to distillation in contact with water; the product in the receiver had a milky appearance and possessed the smell of the plant in a high degree. A volatile oil condensed in the neck of the retort in minute drops, which were easily increased in size by applying a lamp so as to distill it from one part of the tube to another. It possessed a disagreeable narcotic smell, nauseous taste, and was without color. The decoction remaining in the retort did not exhibit the sensible properties of the plant in so great a degree as the distilled fluid. The former on being allowed to cool deposited extractive matter. The incinerated plant also yielded lime and potash. The constituents are hence inferred to be,

Gum,

Tannin,

Chlorophylle,

A yellow coloring matter,

A volatile oil, { in which the active properties are  
believed to reside.

Extractive matter,

Lime,

Potassa.

I was unsuccessful in all attempts at obtaining an organic alkali.

*Alexandria, D. C.*

ART. LII.—ON THE SOURCE, PHYSICAL AND CHEMICAL PROPERTIES, OF A SPECIES OF HUMAN GALL STONE.

By E. NEAL, M. D.

THESE biliary concretions are often found in the hepatic and cystic ducts, or in the common duct of the liver, but by far the greater number, are derived from the gall-bladder itself, in which they are usually formed. At a post-mortem examination of a man, aged 80 years, we removed from that viscus, fourteen calculi which present the following characteristics.

They have a smooth surface, a tetrahedron form, with the angles somewhat rounded; are of a size varying from that of a pea, to a grain of Indian maize, having like it a fine yellow color, striated with lines of a dark brown. This coloring matter forms a crust of about two lines in thickness, is of a short fracture, easily broken off, enclosing a dark brown nucleus. They are insipid, and inodorous, having a greasy feel when rubbed between the fingers, and a specific gravity, little inferior to that of water, being about 0.998.

They are insoluble in water, and, when whole, in cold and boiling alcohol of 35° Baume; in the volatile oils and spirits of turpentine, in the dilute and strong acids, although the nitric changes their yellow color to a light red: but when powdered they are nearly soluble in boiling alcohol and ether. In a dilute solution of pure potassa, they undergo no change at the ordinary temperature, but in a strong solution, at the boiling point, they are partially soluble, the color changing during solution from a yellow to a blue, which is soon altered by contact with atmospheric air to a fine emerald green; which, again, by successive additions of nitric acid, is converted to a blue, violet and red, in the course of a few seconds. They melt at the temperature

of 100° Far., change to a dark brown color, and emit an urinous odor—at a still higher temperature they liquify, become oily, and assume on cooling a brittle mass; when heated still higher, they ignite, burning with a white flame, and much smoke, leaving a black residuum resembling animal charcoal. This residuum effervesces with chlorohydric and nitric acids, and with the former is almost entirely soluble in distilled water, yielding an agreeable and clear solution; with the latter acid, however, the solution is insipid.

From the above, and other experiments, we derive the following conclusions.

1st. That the crust of these calculi is composed of a peculiar coloring material, called by Berzelius, "bilifulvin," which, we may add, is found in small quantities in a healthy person, but accumulates in a state of disease, as in jaundice, so as to produce solid masses. It is insoluble in alcohol and ether, in the strong acids, volatile oils and spirits of turpentine; but with pure potassa and soda, and some of their salts, makes a solution of a blue color.

2d. That this "bilifulvin" is converted into the green coloring matter, which is present in healthy bile by the absorption of oxygen,—its solution in potassa being changed from a blue by this means.

3d. That a peculiar fatty matter enters largely into their composition, called "cholesterine," which is insoluble in water, fusible at 279°, and volatilizable in close vessels without change; its formula being  $C_{36} H_{50} O$ . It is dissolved by boiling ether and alcohol, which on cooling deposits it in brilliant plates of a pearly lustre,—it is not saponified or altered by caustic alkalies, but by a treatment with nitric acid is converted into cholesteric acid.  $C_{26} H_{20} NO_{12}$ .

4th. And lastly. That they are exceedingly analogous to the bezoar stones of the herbivorous animals, if they are not identical in every particular of their composition.

*Philadelphia, December 20, 1844.*

## ART. LIII.—EXTRACT OF SENEGA AND SQUILL.

By JOHN H. ECKY.

Take of Senega and Squill in coarse powder each two pounds. Pour on sufficient diluted alcohol to cover them, and macerate in a covered vessel forty eight hours. Transfer to the displacement funnel, and add diluted alcohol, until it passes tasteless. Distil off the alcohol, and evaporate in a water bath to four pounds. This extract contains all the active properties of the Senega and Squill, and it appears to me, to be the best preparation that can be used for making the compound Honey of Squill, known as Cox's Hive Syrup, for which I give the following formula,

R. Ext. Senega and Squill,	1 lb.
Mel Despumat.	6 lb.

Mix the extract with the honey at a temperature of 160 Fahr., and to every pint of this add sixteen grains of Tartar Emetic. The result is a preparation always of the same strength, but much stronger than any that can be made by the old formulas, and one that will not ferment.

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NOTE. A specimen of this extract was presented with the accompanying communication, at the pharmaceutical meeting of the Philadelphia College of Pharmacy. It was of *soft pulpy consistence*, of a dark shining colour, and highly endowed with the sensible properties of the ingredients. Several formulæ for preparing *Hive Syrup*, have been from time to time devised. That now contained in the United States Pharmacopœia, would seem, from ample experience so far, to meet all the requisitions proposed in its formation, and may be regarded as complete as it can be made, to furnish an elegant preparation. At first sight,



therefore, the proposition to prepare an extract to be used in the formation of the syrup may be regarded as superfluous; but yet under certain circumstances it may have its advantages, among which the chief would appear to be the greater facility of transportation in a country like our own, where medicines are necessarily carried great distances, in which case the occupation of less space in packing becomes important. We are no friends to violation of our Pharmacopœia rules, but as our Journal is the neutral ground upon which all friendly propositions may be made, and the arena in which diversity of opinions may be stated, we look upon Mr. Ecky's communication as possessed of interest.—*Editor of Am. Journ. Pharm.*

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#### ART. LIV.—PREPARATION OF NARCOTIC EXTRACTS.

By SCHEIDEMANDEL.

THE author describes his method, which he particularly recommends for the preparation of these extracts in small quantities, as follows:—

In this neighbourhood (Creussen) *Hyoscyamus*, *Belladonna*, *Digitalis*, *Conium*, &c., grow wild. I therefore gather the plants at the proper time, dry them carefully, and use them in the preparation of the extracts in the following manner:—

The plant, *Hyoscyamus* for instance, is thoroughly dried in a stove by a very gentle heat, until capable of being rub-

bed through a coarse horse-hair sieve. The very finest powder is separated and rejected.

The coarse powder thus obtained I place in a glass funnel of a certain capacity, the neck of which is partially obstructed by cotton loosely thrust into it, and on the top a piece of white filtering paper covered with a layer of sand, which has previously been purified with hydrochloric acid and well washed; this I also well wash after each operation, and dry and preserve for further use. The funnel holds exactly 4 oz. of coarsely-powdered Hyoscyamus. When it is thus arranged, I gradually pour on it spirits of wine of spec. grav. 0.950, in such proportion that the powder is penetrated by it to half the depth of the funnel. I now desist, and find in about half an hour the spirit has penetrated the powder throughout the whole depth of the funnel, and an alcoholic extract of a dark green color begins to drop into a glass vessel placed beneath.

When the dropping begins to slacken, I commence adding small portions of spirits of wine, about  $\frac{1}{2}$  an oz. every quarter of an hour. If I commence the operation at 9 A. M., I can progress so far that by the evening I have added the last portion of the spirit, using 18 oz. of spirit in all. I now cover the funnel with a glass plate, and commence the next morning adding pure water in successive small quantities of an ounces in the same manner as with the spirit. This is continued until the drops are no longer green but brown, that is, until all the alcoholic extract is displaced by the water, and the watery extract begins to fall from the funnel. When this takes place, the receiver containing the spirituous extract is removed and well covered, and replaced by an empty one. The alcoholic solution in the glass removed is of a remarkably fine green color, with the well-known repulsive odor of Hyoscyamus. The treatment with the water is persevered in during the day in the same manner as with the alcohol, until the dropping fluid becomes transparent; I now once more add water; it is then

covered with the glass plate, and allowed to drain quietly during the night.

Whilst this extraction with water is going on, I filter the alcoholic solution from the waxy matter, and distil off the alcohol in a small steam apparatus, until only a few ounces remain. The fine green syrupy residue I then pour into a porcelain dish, and add to it the watery solution when evaporated to a syrupy consistence, and evaporate it gently over the flame of a small spirit-lamp until of the proper consistence, by which means I procure an extract that dissolves completely in water with a fine green color, and in point of activity leaves nothing to be desired. I proceed in the same manner with Belladonna, Digitalis, Conium, &c., and especially recommend this method to pharmacutists in small places, as affording a certain and active product both in a quantitative and qualitative respect.

I have always obtained 1 oz. 6 drms. of extract from 4 oz. of coarsely-powdered Hyoscyamus.

*Ibid, from Buch. Rep.*

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#### ART. LV.—ON THE DEOXIDATION OF FERRIDCYANIDE OF POTASSIUM, AND OF SALTS OF THE PEROXIDE OF IRON.

By PROFESSOR SCHÖNBEIN.

WHEN an iron wire with a clean surface is immersed in an aqueous solution of ferridcyanide of potassium, it becomes quickly coated with a layer of prussian blue; and if a number of such wires be placed in a similar solution, there very soon separates a considerable quantity of a bright blue body, which, by exposure to the atmosphere,

acquires a dark blue color. If into the solution of ferridcyanide air or pure oxygen be passed while it is in contact with the metallic iron, the formation of the blue substance proceeds more rapidly. When finely-divided iron is conveyed into the solution instead of iron wire, and air blown in through a glass tube, the reaction takes place still more rapidly.

However short a time the iron may have remained in contact with the solution of the ferridcyanide, the latter will have become so altered that it is colored blue when treated with a solution of a persalt of iron.

If the solution be boiled until all the air is expelled from it, and an iron wire, from which likewise the adherent air has been removed by heating in boiling water, be placed in it, the formation of the blue substance around the wire does not occur so long as the liquid is kept boiling, at least not in any perceptible degree. As soon, however, as the solution is allowed to cool, the metal is seen to envelope itself with a blue coating, *i. e.* if contact between the atmosphere and the solution of ferridcyanide be not prevented.

The solution of ferridcyanide was allowed to boil in a glass flask for ten minutes, and a number of bright iron wires kept in boiling water for the same length of time; the latter were then conveyed as quickly as possible into the boiling solution of ferridcyanide, and allowed to boil for a few minutes, upon which the flask was closed as airtight as possible. During the first day the wires remained perfectly bright, but on the following day several blue spots were observed on them, the number and size of which became larger and larger, and from which subsequently proceeded minute streaks of a somewhat dirty blue color. A similar flask was filled with unboiled solution of the ferridcyanide and bright iron wires, and left open. In a few hours not only had the wires become surrounded with a blue coating, but a large number of the above-mentioned blue streaks were seen to project from the wires into the

liquid. The occurrence of these blue streaks is a fact which deserves particular attention, since it appears to prove that the body resembling prussian blue is able to form at places in the solution of the ferridcyanide where there is no metallic iron.

If metallic iron be left sufficiently long in contact with the solution of ferridcyanide of potassium, the latter becomes almost entirely decolorized, and moreover loses the property of forming prussian blue on bright iron. Such a solution affords with pernitrate of iron considerable dark blue precipitates; with the protosulphate of iron, on the contrary, white ones.

Metallic zinc decomposes the solution of ferridcyanide no less rapidly than the iron. If bright laminæ of zinc be placed in an open vessel filled with this solution, yellowish-white points soon appear on them, and after some time a dirty white substance is deposited in the state of a powder at the bottom of the vessel. It consists, according to preliminary experiments, of the cyanide of potassium and zinc, which is probably mixed with some oxide of zinc. If only a trace of this white body be formed, the residuous solution of ferridcyanide is rendered blue by the nitrate of the peroxide of iron, and the precipitate of prussian blue is more abundant when the action of the zinc on the solution of the ferridcyanide has continued for some length of time. The solution, altered in this manner, is also no longer capable of producing prussian blue on bright iron. It is also a very remarkable circumstance that the solution thus altered by zinc disengages ammonia in perceptible quantity when hydrate of potash is added to it, and it is then warmed. In order that the above changes may be effected in the solution of the ferridcyanide of potassium by the zinc, it likewise appears necessary that free oxygen should be present.

When a solution of the ferridcyanide of potassium is brought into contact with arsenic, antimony, bismuth, lead



and tin, it is rapidly altered, and is colored blue with salts of the peroxide of iron. If the contact between metal and solution has lasted only for half a minute, and even at the ordinary temperature, there is nevertheless a perceptible blue coloring produced on the addition of the pernitrate of iron to the solution; and if the metals in question be left for several days in the dissolved percyanide, this will afford considerable precipitates of prussian blue with persalts of iron.

It is remarkable that cadmium acts very slowly on the percyanide, and this metal must have stood for several hours in contact with the solution before the latter exhibits a perceptibly blue tint on the addition of pernitrate of iron. Even copper, mercury and silver effect a change in the solution of the percyanide, and convert a portion of it into the proto-cyanide. But this reaction proceeds very slowly, and several days' contact is requisite for the solution to become blue on the addition of pernitrate of iron.

A number of the above-mentioned metals lose their lustre (for instance lead) when placed in the solution of percyanide, and become coated with a film, the chemical nature of which the author has not examined more minutely. It is not improbable that they are compounds of cyanogen, as with zinc and iron. A very easy and simple manner of demonstrating the chemical alteration which the solution of the percyanide undergoes during contact with the above metals, consists in conveying a drop of the liquid to the bright surface of one of the metals, and then adding to it a drop of dissolved nitrate of iron. Immediately after the mixture of the two has taken place, the surface of the metal touched by them is coated with a layer of prussian blue, and the above-described reaction ensues almost instantaneously, even though the metals employed be copper, mercury or silver.

As will appear from subsequent details, the latter metals induce the formation of prussian blue principally from their converting the dissolved persalt of iron partially into a pro-

tosalt. The more readily oxidized metals, such as zinc, iron, tin, &c., give rise to formation of prussian blue under the above-mentioned circumstances in a two-fold manner. These metals quickly convert a portion of the percyanide into protocyanide, and a portion of the persalt of iron into protosalt.

The fact that even most carefully-cleansed plates of platinum, palladium and gold produce prussian blue when a mixture of the aqueous solutions of ferridecyanide of potassium and perntrate of iron is brought on to them, is highly remarkable. It is true that the change in this case takes place very slowly.

We are therefore apparently justified in concluding that all metallic bodies, without a single exception, are capable of producing the same effect on the haloid salt. If the solution of the cyanide be poured over finely-divided protoxide of copper or protoxide of tin, and both substances left only for a short time together, the filtered liquid is rendered strongly blue on the addition of perntrate of iron. Probably other oxides, which have a greater inclination to combine with more oxygen, behave in a similar manner.

But it is not only the metallic bodies or certain metallic compounds which are capable of exerting a chemical influence of the kind previously described on the solution of the ferridecyanide, but a series of non-metallic substances likewise exhibits a similar behavior. If phosphorus be held for some length of time in contact with the solution of the percyanide, the latter acquires the property of becoming blue (only indeed in a faint degree) on the addition of a solution of peroxide of iron. But if a piece of phosphorus be held in a mixture of percyanide and solution of a persalt of iron, and be allowed to remain some time in the liquid or exposed to the atmosphere, it becomes surrounded with a coating of prussian blue. This phenomenon appears, however, to be principally owing to the persalt of iron being partially converted by the phosphorus into a protosalt. Schönbein passed

pure hydrogen gas for some length of time into the solution in question; it appeared, however, to undergo no change whatever in its chemical constitution under these circumstances. But when the hydrogen came into contact with the dissolved percyanide, either in a nascent state or in certain chemical combinations, it had a different action. If two vessels, communicating with one another by means of a porous septum, for instance animal membrane, be filled with the dissolved cyanide, and the conducting wires of a somewhat powerful battery be conveyed into the liquid of these vessels, a portion of the solution of the percyanide in which the negative electrode is immersed, *i. e.* in which hydrogen is separated, is rapidly changed, and affords a blue precipitate with perntrate of iron.

Hydrogen combined with sulphur, selenium, phosphorus, arsenic, antimony and tellurium, although still gaseous in these combinations, acts nevertheless very rapidly on the solution of the ferridecyanide, and indeed in a similar manner to nascent hydrogen. If either one of the last-mentioned gases be passed for only a short time into the solution of the cyanide, it is so much altered by it that it affords blue precipitates with persalts of iron, even after the expulsion of any gas dissolved in the liquid. If the solution of cyanide, before being submitted to the action of any of these hydrogen compounds, be mixed with a solution of the perntrate of iron, a very considerable precipitation of prussian blue takes place on the entrance of the gas into the mixture. It must, however, be observed that the three first mentioned gases act far more rapidly than the three metallic hydrogen compounds are capable of doing.

If the solution of cyanide be allowed to stand with æther or alcohol for ever so long, it does not appear that the mixed substances act on one another under these circumstances, since a solution thus treated is not rendered perceptibly blue on the addition of a persalt of iron. But if, besides the æther or alcohol, some nitrate of iron be added to the dissolved cyan-

ide, the mixture soon begins to turn blue, and after some days a considerable precipitate of the most beautiful prussian blue has formed. It is therefore evident that the æther or alcohol has either changed the percyanide into protocyanide or the persalt of iron into protosalt.

If ordinary sugar be added to the solution of percyanide, and the liquid be kept boiling for a few minutes, it is turned blue on mixing pernitrate of iron with it. The mixture will also appear blue if some of the salt of iron is added to it; after some hours, without any exposure to heat, and after some days there will be a considerable deposit of prussian blue.

When the solution of percyanide is mixed and warmed with formic acid, it becomes blue without requiring any persalt of iron; if the mixture be evaporated until all acid is expelled and the residue extracted with water, this extract will afford with solution of nitrate of iron a precipitate of prussian blue. The same reaction takes place in the cold, only more slowly. Acetic, tartaric and citric acids act in a similar manner on the solution of cyanide, and probably several other organic acids. Oxalic acid appears to have no action either at the ordinary or at an increased temperature. Uric acid is remarkable, above all other organic compounds, from its quick action on this salt. If it has stood for only a minute with a solution of percyanide, this is rendered blue on the addition of nitrate of iron. A solution of creosote in water has perhaps a stronger action; on shaking it for a few instants with a solution of percyanide, and then adding a persalt of iron, it is rendered strongly blue. If the excess of creosote has been expelled from the solution by heat, nitrate of iron causes a very considerable precipitate of prussian blue.

Cinchonine and morphine behave similar to uric acid and creosote, while strychnine and quinine appear to have no action.

When urea is conveyed into a solution of the percyanide,

it appears to have no action, but on evaporating the mixture to dryness, and warming the residue so as to disengage ammonia, the mass becomes strongly blue. No change of color ensues previous to the disengagement of ammonia.

The behaviour of nitrate of ammonia to the cyanide is likewise remarkable; if some of the salt be heated to fusion, and a few crystals of the ferridecyanide of potassium conveyed into the liquid mass, it immediately becomes of a dark blue, and there is a strong smell of prussic acid. If the mixture is still further heated, it assumes a reddish-yellow color, and now affords no further precipitate either with a persalt or protosalt of iron; but if the mass, while still blue, is treated with water, the filtered solution gives prussian blue with nitrate of iron. If a solution of the percyanide is added to one of neutral sulphate of ammonia, and the whole is evaporated to a pasty mass, it appears green. If it be now heated to fusion, it acquires a light blue color, and if some water be poured over the mass thus treated, it becomes deep blue, and there is a separation of prussian blue. The filtered liquid is not rendered perceptibly blue by nitrate of iron.

If a few drops of hyponitric acid are added to a mixture of ferridecyanide of potassium and nitrate of iron, there is a precipitate of prussian blue. Since pure nitric acid produces no change in the above mixture, this reaction may be employed to detect even small quantities of nitrous acid in nitric acid. Nitric oxide has a very energetic action on a mixture of percyanide and nitrate of iron; each bubble of this gas, on entering the solution, becomes surrounded with a blue coating, and prussian blue is very rapidly thrown down. Nitrous oxide behaves with perfect indifference towards such a mixture.

Sulphurous acid likewise possesses in a high degree the power of altering the dissolved percyanide in such a manner that it shall afford blue precipitates with persalts of iron.

Since the precipitation of prussian blue by the nitrous acid, nitric oxide and sulphurous acid from a solution of the above-



mentioned mixture of salts, might probably depend solely on those three combinations converting the persalt into protosalt, while they leave unaltered the percyanide, the author convinced himself that the three bodies mentioned also exercise a decomposing action on the solution of the percyanide.

It was to be supposed that the bodies which reduced the ferridecyanide of potassium to ferrocyanide would likewise have a reducing action on the persalts of iron; the following experiments entirely confirm this supposition. For instance, if a solution of nitrate of iron be left only for a few minutes, or for a shorter time, in contact with arsenic, antimony, bismuth, cadmium, lead, iron, zinc and tin, the solution of percyanide becomes perceptibly blue. Even copper, mercury and silver produce a similar change, but more slowly. Whether palladium, platinum and gold are able to effect it with time has not yet been ascertained.

Some protoxides, as for instance that of copper, when placed for a short time in contact with the solution of nitrate of iron at the ordinary temperature, alters the salt of iron in such a manner that the solution of percyanide is rendered blue by it.

Phosphorus appears to act more rapidly on the solution of the nitrate of iron than on that of the cyanide.

Sugar heated only for a short time with a solution of the persalt of iron likewise causes it to give a precipitate of prussian blue in the solution of the cyanide. Formic acid, warmed but for a few instants with the dissolved salt of iron, induces the formation of so much protosalt, that on mixing this liquid with the percyanide prussian blue is precipitated. Citric, acetic and tartaric acids behave in a similar manner, but lithic acid is most remarkable from its deoxidizing action. If this acid be left in contact only for a minute with a solution of the nitrate of iron, the filtered liquid has acquired the property of precipitating prus-

sian blue from the solution of the percyanide. Warming of the solution hastens the reaction of the lithic acid.

Creosote even surpasses lithic acid by its deoxidizing action on persalts of iron. Cinchonine and morphine act in a similar manner, but not so rapidly. Nascent hydrogen, in contact with a solution of persalt of iron, imparts to it the property of precipitating prussian blue from the solution of the percyanide.

Nitrous acid, nitric oxide, sulphurous acid, and the combinations of hydrogen with selenium, phosphorus, arsenic, antimony and tellurium, behave in a similar manner.

Dilute solutions of oxalic acid, nitrate of iron and ferridcyanide of potassium were mixed and conveyed into a flask, into which nitric oxide, sulphuretted and phosphoretted hydrogen were introduced. According to the preceding statements these gases precipitate prussian blue from a liquid containing only nitrate of iron and percyanide; in the mixture, however, containing oxalic acid, they cause no such precipitate, but in order to obtain this negative result it is requisite that there should not be too little oxalic acid present in the solution.

With respect to seleniuretted hydrogen, oxalic acid is not able to prevent entirely its action on the mixture, which immediately becomes blue. When a solution of the percyanide is placed in contact with lithic acid and oxalic acid, no blue coloring is produced by a persalt of iron, however long the substances may have been together, nor does heating in any way assist.

Oxalic acid likewise prevents sugar and other organic matters from altering the percyanide and the persalts of iron in the above manner, nor is there any prussian blue precipitated, even on adding nitrous acid to a mixture containing percyanide, nitrate of iron and oxalic acid.

Besides the interest which these experiments offer, they likewise lead to ready methods of detecting nitric oxide, nitrous acid and sulphurous acid. Moreover, since the or-

ganic bodies employed in this reaction are likewise subject to decompositions, a more accurate investigation of these relations will probably lead to the knowledge of many new compounds.

*Chem. Gaz. from Journ. für Prakt.*

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ART. LVI.—ON THE FEBRIFUGE PROPERTIES OF VARIO-  
LARIA AMARA.

By DR. DASSIER.

THIS lichen grows in the form of large grayish crusts upon the bark of beech-trees in mountainous regions. When reduced to powder, it excites its influence upon the pituitary membrane, and applied to the tongue, very speedily gives rise to a distinct bitter taste, which increases by degrees, and is retained for a considerable length of time. It was examined in 1831 by M. Alms, who extracted from it a bitter principle, to which he gave the name of *picro-lichenine*. If taken into the stomach, the powder of Variolaria creates an appetite, and acts like all bitter tonics by focusing the digestive powers and imparting a new vigor to the constitution. It does not appear to exercise any influence upon the nervous system, like the sulphate of quinine. By reason of its excessive acerbity, the Variolaria cannot be prescribed in the form of a moistened powder in a vehicle such as quina. M. Dassier has administered it in the shape of pills incorporated with conserve of roses, or in that of lozenges mixed with chocolate. It is best to prescribe it in doses of 7 to 15 grs. for adults, to be taken in the course of 24 hours, and of 3 to 6 grs. for children under 10 years of age. In quotidian and tertian fevers, those in which the

Variolaria has proved itself most efficacious, it has acted beneficially after the first or second dose, and 7 to 9 grs. have very often been sufficient to effect a cure. In cases, however, where the first doses do not act, we cannot reckon upon any good results.

M. Dassier has given Variolaria in a very great number of intermittent, quotidian, tertian and quartan fevers. In the second of these he has almost constantly, in the third kind frequently, in the last rarely, obtained a cure. It is true that he has never exceeded the dose of 1 grm. in the course of 24 hours. Despite the encouraging observations of M. Dassier, we are of opinion that the Variolaria should only be prescribed under the following circumstances. :—

1. As a substitute for sulphate of quinine.
2. In cases of mild quotidian or tertian fevers.
3. That recourse should never be had to its use where we suspect a severe attack of fever, or one that may assume a dangerous character.

It would be interesting, on account of its low price, and the ease with which it can be procured, to ascertain whether, if given in larger doses than has been above specified, its properties might not prove more efficacious. At all events, new researches upon the active principle of this lichen are well deserving of being made.

*Ibid, from Journ. de Pharm.*

## ART. LVII.—ON THE DISTRIBUTION OF MINERAL SUBSTANCES IN INDIVIDUAL ORGANS OF PLANTS.

BY DR. A. VOGEL, JUN.

THE inorganic constituent parts are not in the same manner distributed throughout the whole plant, but they are in its several organs variously grouped. The ashes of the root and those of the trunk differ not only quantitatively, but also qualitatively, from the ashes of the leaves, flowers and fruit. Hertwig, at the request of Prof. Liebig, showed that this is the case with reference to some plants. For instance, the ashes of the tuber of potatoes are essentially different from the ashes of the herb of potatoes; the ashes of the bark are again different from those of the wood. I made some experiments with residues of ashes of individual organs of plants, with the view of assisting in finding out the laws by which the distribution of fixed substances in the individual organs of plants are regulated. Since in these experiments it was not the ashes themselves, but rather their mutual relation which was to be considered, it was naturally totally indifferent which was the plant that became matter of investigation. I therefore selected such plants as could easily and completely be converted into ashes; for the analysis of ashes containing much coal, viz., those which on continued ignition still contain 3—4 per cent. coal is always liable to great mistakes.

Through the kindness of Counsellor de Martius, I obtained from the Royal Botanical Garden at Munich several parcels of plants, which, their individual organs having been separated and washed, were reduced to ashes. To separate the soluble parts from those that are insoluble, I treated the ashes with boiling water. The residue insoluble in water was then dissolved in muriatic acid, and the phosphoric earths as well as the oxide of iron were afterwards, by



caustic ammonia freed from carbonic acid, precipitated from their acid solution. The liquid was then filtered, and the lime determined by oxalate of ammonia, and after this had been separated, the magnesia was precipitated by phosphate of soda.

I selected for the first experiment the ashes of *pyrus spectabilis*, and analysed the ashes of the trunk, the leaves and fruits, each by themselves.

1. *Trunk*.—The trunk, after having been cut into small pieces, burns easily, and on being calcined over a spirit lamp finally yields white ashes amounting scarcely to 0.1 per cent. carbon. Since they contained carbonic earths in considerable quantities, it was necessary to moisten them after calcination with carbonate of ammonia, to restore the carbonic acid which was driven off by the heat. Water dissolves but little of the ashes; in the watery solution, which is of a feeble alkaline reaction, are no phosphoric alkalies, but merely traces of carbonates contained. The constituent parts soluble in water amount to 4 per cent. These ashes consist chiefly of carbonate of lime, amounting to 82 per cent. Magnesia enters only at an admixture of a trifle per cent. The ashes contain 8 per cent. of insoluble phosphates, viz., phosphates of lime and phosphates of magnesia.

2. *Leaves*.—The ashes are perfectly white, and little soluble in water, which liquid extracts from them 7 per cent. of alkaline carbonates, with traces of sulphate of potassa, chloride of sodium and phosphate of potassa. These ashes, like those of the trunk, chiefly consist of carbonate of lime; in them, however, amounting to less by 10 per cent. The phosphate of lime and magnesia amount in these ashes to 10 per cent. The quantity of magnesia is nearly two-fold; it was 4.9 per cent., and is now 9.76 per cent.

3. *Fruits*.—Totally discrepant from both the ashes of the trunk and leaves are those of the fruit. The soluble parts of the other ashes amounted to 4—7 per cent.; those con-

tained in these ashes were 33.1 per cent., hence one-third of the whole quantity, which consisted of equal parts of alkaline carbonates and phosphates. The quantity of carbonate of lime is diminished to 37 per cent.; whereas the phosphate of lime and magnesia augment to 18 per cent. The phosphoric combinations, therefore, in the ashes of the fruit amount to more than one-third, namely, to 36—38 per cent. It is striking that some traces of silica are met with only in these ashes.

The amount of iron which has been determined by special experiments diminished from trunk to fruit. The quantity of iron, however, in the ashes of this plant is not material, amounting even in the trunk scarcely to 0.5 per cent. According to this analysis, the ashes are composed of:

*Trunk.*

Alkaline carbonates,	4.6
Carbonate of lime,	82.2
Carbonate of magnesia,	4.9
Phosphate of lime and magnesia,	8.8
	<hr/>
	100.5

*Leaves.*

Alkaline carbonates, with traces of chloride of sodium, sulphate of potassa and alkaline phosphates,	6.8
Carbonate of lime,	72.9
Carbonate of magnesia,	9.76
Phosphate of lime and magnesia,	10.5
	<hr/>
	99.96

*Fruit.*

Alkaline carbonates,	1.9
Alkaline phosphates,	14.1
Carbonate of lime,	37.
Carbonate of magnesia,	5.52
Phosphate of lime and magnesia,	18.6
Silica,	3.7
	<hr/>
	97.92

If we compare the composition of these three ashes, we arrive at the following conclusions:—

1. The amount of salts soluble in water augments nearly exactly eight times, from trunk to fruit. The soluble salts of the ashes of the trunk, leaves and fruit of the plant examined, are in the proportion of 1 : 2 : 8. Here manifestly one intermediate proportion is left out. Is it, perhaps, formed by the flowers?

2. The phosphoric salts augment from trunk, and this is taking place at the expense of the carbonic combinations which from trunk to fruit are diminishing from 86 to 45 per cent.

To show the increasing amount of phosphoric acid in the ashes from trunk to fruit in one more instance, I examined three ashes of *sambucus nigra* solely with reference to their phosphoric acid. The phosphoric acid was determined after a method communicated to me by Prof. Liebig; a method which for its exactness and facility of execution is preferable to any other. The ashes to be investigated for phosphoric acid are merely to be dissolved in nitric acid, and the solution precipitated by an excess of acetate of lead. The precipitate contains phosphate of lead and sulphate of lead, if sulphuric acid was present, and basic nitrate of lead. It is to be calcined and weighed. It now consists of sulphate of lead, phosphate of lead, and oxide of lead. It is then again to be dissolved in nitric acid, afterwards sulphuric acid added, and next some alcohol, and the obtained sulphate of lead is to be weighed. From this the quantity of lead is calculated, which, as well as the sulphuric acid, the amount of that latter acid having been determined on treating another portion of the ashes by baryta, are deducted from the weight of the sulphate and phosphate of lead and oxide of lead. The remainder is phosphoric acid.

The quantity of phosphoric acid found by this method in the ashes of the trunk amounted to 10.5 per cent.; in those of the leaves to 13.6 per cent.; in those of the fruit to 20.3 per cent.

It is naturally impossible, by a few analyses of ashes of plants, to ascertain a general law; for the proportion of fixed constituent parts of individual organs differs in various genera of plants. The cereals, for instance, contain in their fruit no constituent parts which are soluble in water, whereas their straw contains them in no inconsiderable quantities.

It is to be regretted that the analyses of ashes, if conscientiously executed, require much time; to which circumstance it may perhaps be ascribed that till now no sufficient number of analyses has been performed. But the first impulse having been given by Prof. Liebig, in time this want will certainly be supplied.

*Chemist, from Ann. der Chem. und Pharm.*

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ART. LVIII.—ACTION OF SOME OF THE ALKALINE SALTS  
UPON THE SULPHATE OF LEAD.

By J. LAWRENCE SMITH.

It has been for some time known that certain neutral salts possess the property of dissolving to some extent the sulphate of lead, which property belongs neither to the acids or bases constituting these salts. By referring to Berzelius' Chemistry, it will be found that the acetate and nitrate of ammonia are among the number. "1 part of the sulphate was dissolved in 47 parts of a solution of the acetate, of sp. gr. 1.036; and in 172 parts of a solution of the nitrate, of sp. gr. 1.144." In the *Annalen der Chem. und Pharm.*, vol. xxxiv., 235, will be found the following statement under the head of *Reactionem*:—"Sulphate of lead is easily dissolved, and in large quantity, by a solution of

neutral tartrate of ammonia. A concentrated solution forms after some time a stiff jelly, like silica." This last is no doubt a double tartrate of lead and ammonia.

I had also observed, some time previously, that a solution of the citrate of ammonia, when poured upon the sulphate of lead and allowed to stand, altered the character of the sulphate, and this, with the other fact above stated, led to the examination of what was really the action of these as well as other ammoniacal salts in general, upon the sulphate in question, and it is found that in every case it was decomposed.

*Citrate of Ammonia.*—If a solution of citrate of ammonia be poured upon the sulphate of lead and shaken together, the clear solution will be found to contain the sulphate of lead, as shown by hydrosulphuric acid and a salt of baryta—(taking care in testing with the baryta to acidulate first with pure nitric acid, to prevent the formation of the citrate of baryta.) If they be allowed to remain several weeks in contact, the solution will be found to contain more lead, the sulphate having undergone decomposition, sulphate of ammonia and a double citrate being the result; as this latter salt is not very soluble, a large portion of it remains in the form of a precipitate. The rapidity of this change is in proportion to the concentration of the solution of the citrate. If instead of performing the experiment in the cold, we boil a tolerably concentrated solution of the citrate with the sulphate of lead, a very large quantity of the latter will be dissolved, and the solution become perfectly transparent; if it be set aside and allowed to cool, in the course of a few hours an abundant white precipitate will be formed, and upon testing the clear solution, sulphuric acid, ammonia, citric acid, and oxide of lead will be found present. The precipitate, when washed, affords citrate of lead and ammonia. I was at first inclined to think it simply a citrate of lead, attributing the ammonia present to some of the citrate not washed out; but from its



possessing certain characters which do not belong to the simple citrate, I consider it a double of lead and ammonia. It contains not the slightest trace of sulphuric acid. It was not analysed, from the difficulty of obtaining it perfectly pure, as the water used to wash it decomposes it, and as yet this difficulty has not been surmounted. So then the result of the action of the citrate of ammonia upon the sulphate of lead is, first to dissolve it, and subsequently to decompose it, forming the sulphate of ammonia and citrate of lead and ammonia.

*Tartrate of Ammonia.*—If a solution of this salt be added to the sulphate of lead and shaken with it in the cold, the clear solution will be found to contain both lead and sulphuric acid; and if set aside for few weeks, the precipitate will have changed its character, having assumed a crystalline nature; the solution will no longer contain lead, but the quantity of sulphuric acid present will be found to have increased. The precipitate now consists of tartrate instead of sulphate of lead, which is completely soluble in dilute nitric acid, affording no precipitate with a salt of baryta. If the mixture of the tartrate and sulphate be boiled, this change takes place more rapidly, and in a manner somewhat different from the case of the citrate; the sulphate will not be dissolved in such large quantities, and, moreover, by continuing to boil the solution after the sulphate has been completely dissolved, the tartrate forms during the ebullition, and is precipitated in little shining crystals. If the ebullition be continued a sufficient length of time, the whole of the lead previously dissolved will combine with the tartaric acid. This is different from what takes place with the citrate, which, when boiled upon the lead salt, dissolves it, and no length of ebullition will produce a precipitate. The action of the tartrate is first to dissolve the sulphate, decompose it in part, and form a double tartrate of lead and ammonia, which last salt is subsequently decomposed by continued contact with water, or still more rapidly by its solution being boiled.

*Acetate of Ammonia.*—This salt also dissolves to some extent the sulphate of lead, but not so readily as either of the above salts. If the solution be boiled and evaporated to dryness, crystals of sulphate of ammonia are obtained, and an uncrystallizable salt of lead, probably an acetate of lead and ammonia; from the difficulty of separating the sulphate of ammonia from it, it is impossible to pronounce positively whether it is a double salt or simply an acetate of lead. We see in this reaction the existence of a soluble salt of lead and the sulphate of ammonia simultaneously in the same solution, without a precipitate being formed.

*Oxalate of Ammonia*—Dissolves but slightly the sulphate of lead, owing, no doubt, to the impossibility of forming a double salt; but it will nevertheless decompose largely, the sulphate furnishing the oxalate of lead.

*Muriate of Ammonia*, if boiled with the sulphate of lead, will decompose it instantaneously, furnishing the chloride of lead and sulphate of ammonia.

The *Nitrate of Ammonia* does the same, forming nitrate of lead and sulphate of ammonia.

*Carbonate and Succinate of Ammonia* produce similar effects.

The action of most of the corresponding salts of potash and soda was examined, and with very similar results. The fact is, it would appear that those alkaline salts which dissolve the sulphate of lead, decompose it, without reference to the time occupied in the solution, as in the case of carbonate of ammonia, which decomposes the sulphate at the very instant of its solution; and it is impossible to detect at any one time other than a trace of lead in solution, whereas the quantity of sulphuric acid is constantly increasing.

The explanation is clear: the sulphate of lead is a salt with a strong acid and feeble base; the alkaline salts used contain feebler acids and stronger bases; they dissolve the sulphate, thus affording an opportunity for the acids and bases to act upon one another, under favorable

circumstances, and to follow a natural law in chemistry, the stronger acid combined with the stronger bases, and *vice versa*.

From the above facts, some important hints might be afforded to analytical chemistry, for it will be at once seen that the presence of any of the alkaline salts in a solution from which it might be wished to precipitate lead in the form of sulphate, would affect the accuracy of the result. What is true of the sulphate of lead may be found also true for other insoluble salts. Moreover, this shows the importance, in the analysis of mineral waters for instance, of weighing well the relative strength of the various acids and bases therein found, in order to ascertain what salts are present, and not to be contented with evaporating the water to dryness, and considering such salts as remain to be those existing in the water, for many of them may be formed during the evaporation. It is not at all improbable that before many years the examination of mineral waters will be based as much upon calculation as upon analysis, the former, of course, being guided by the latter, and by certain laws not yet developed.

*Ibid, from Am. Journ. of Science and Arts.*

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ART. LIX.—ON THE DIFFERENT KINDS OF CALCINED  
MAGNESIA EMPLOYED IN MEDICINE.

By M. MIALHE.

It is in consequence of some remarks published concerning an *advantageous formula for employing magnesia as a purgative*, which I last year inserted in the Bulletin de Therapeutique, that I have been led to make the chemical

and therapeutical observations concerning the varieties of oxide of magnesium found in pharmacy, which I now make public.

The following is the formula in question:—

*Medicine of Magnesia.*

<b>R</b> —Calcined magnesia,	8
Simple syrup,	80
Orange-flower water,	20

Bruise the magnesia carefully with a little syrup, and, when the mixture is perfectly homogeneous, add the remainder of the syrup and the orange-flower water.

Four months after the publication of this formula, M. Gobley, our colleague, was led to prove a chemical phenomena with which I was partially acquainted, but to which chemists had not called attention, namely, the property which recently calcined, that is to say, anhydrous, magnesia possesses of remaining liquid when in contact with a certain quantity of water, and of afterwards becoming, in the hydrated state, solid after 24 hours' contact.

The consistence which the potions had acquired was due to the solidification of the water by the magnesia, or rather to the hydralation of the magnesia.

However, I would observe that the two magnesian potions which have served for the text of M. Gobley's publication, had been prescribed with a smaller quantity of syrup than that I have indicated in my formula, which rendered their solidification more easy and more prompt. This fact was, moreover, proved by the author.

Although, says he, in this potion the magnesia is in contact with only six parts of water, there was no solidification in 24 hours; this is owing to the large proportion of sugar in the mixture. Indeed, if we diminish the syrup, and replace it by an equal quantity of water, the mixture solidifies in 24 hours.

From this, M. Gobley concludes that it will be necessary

to prescribe the *medicine of magnesia* with the proportions I have indicated when it is to be taken in less than three days ; but that it will be necessary to increase the proportion of water when it has to be kept longer.

The following, according to M. Gobley, is the formula of a *draught of magnesia*, which may be kept liquid for an indefinite period:—

<b>R</b> —Calcined magnesia,	8
Syrup of orange flowers,	30
Distilled water,	87

I am now going to point out how it is that I have not observed solidification of oxide of magnesia in preparing my draughts: and, first, I might remark that the medicine of magnesia belonging to the class of medicaments prepared only when wanted, that is to say, magistral medicaments, I had not attended to its conservation ; but I can make no such excuse. Here is the truth. After having theoretically and practically proved that the presence of sugar in the magnesian draught greatly augments its efficacy, which, to me, was indisputably established some time before the publication of my formula, I made some experimental investigations to ascertain whether all the varieties of calcined magnesia were equally adapted for suspension in syrup ; if all were equally miscible in that vehicle, and I soon ascertained that the light variety of calcined magnesia is best adapted for preparing the purgative draughts having oxide of magnesium for their base. Moreover, experience taught me that all the varieties of light calcined magnesia are not equally fit for employment in the preparation of *white medicines*. That which appeared to me to succeed the best, and to which, consequently, I give the preference, is a variety of oxide of magnesia generally well decarbonated, very white, which has been very common in commerce for some years, and which is said to come to us from London.



The medicines of magnesia prepared with the English calcined magnesia, of which I have just spoken, present the form of a white and very homogeneous liquid, of the consistence of a clear syrup, and *may be kept liquid for an indefinite period.*

What was my surprise, after this description, to learn that the magnesian draughts prepared by M. Gobley had presented to him totally different physical properties!

To what could the difference of our results be owing?

Was it to the chemical nature of the oxide of magnesia employed by me?

But my magnesia was pure: it did not contain even appreciable quantities of carbonic acid.

Was it due to the presence of a certain quantity of water which the English decarbonated magnesia might, perhaps, contain?

I thought for some time that it must be thus, being convinced by analysis that this English magnesia really contained water; that it contained as much as 20 per cent. of its weight, that is to say, one-fifth.

However, it was not to this that the difference of the results was owing; for, having prepared a hydrate of magnesia similar to that of London, and having prepared with it a *medicine of magnesia*, the latter acquired, after several days, a consistence incomparably greater than English decarbonated magnesia takes under the same circumstances.

I wish for a moment to call the attention of practitioners to the intimate nature of the light calcined magnesia which comes to us from London, and which I will designate under the name of hydrate of magnesia, or better still, under the name of *slaked magnesia*.

#### *Hydrated or Slaked Magnesia.*

This commercial variety of decarbonated magnesia is very white, very light, very soluble in the acids, and con-

tains little or no carbonic acid. It always contains a very great quantity of water, varying in proportion from 12 to 20 per cent., as I have ascertained by experiment.

For some time I thought that I was the first to prove the presence of water in light English calcined magnesia, but I hasten to declare that this is not the case. M. Dubail, in his excellent Inaugural Thesis, has devoted an article to it, from which I will quote some passages which leave nothing to be desired:—

“For some time decarbonated magnesia has come to us from London, it appears, which is sold at a lower price than it can be manufactured for here, whatever economy be used.

“This magnesia is rather lighter than ordinary calcined magnesia; it dissolves like it, and more easily, without effervescence, in the acids. It gives no indication of any foreign base—it is therefore regarded as pure; but, when calcined, it loses 20 per cent. of water.”

What is the true nature of this variety of decarbonated magnesia? I had presumed for an instant that this oxide of magnesium should constitute a hydrate in definite proportions; the same idea occurred to M. Dubail, but I was very soon convinced of the contrary; it is a mixture of hydrate and non-hydrated oxide; it is a hydroxide in variable proportions.\*

By what process has this decarbonated magnesia been obtained?

This calcined magnesia has certainly been prepared by the ordinary method, namely, by the calcination of the hydrocarbonate; but it has afterwards been exposed to the damp air for a more or less long time, or it has been purposely exposed, which is probable, or it has accidentally become exposed during the journey; however, by exposing recently calcined magnesia to humid air, I have produced, in two or three days, an hydroxide of magnesia in every

\* The true hydrate of magnesia contains 30 per cent. of water.

respect similar to that which comes from London, and capable of replacing the latter in the preparation of magnesian draughts, which is not the case, as I have already said, when hydroxide of magnesia has been instantaneously prepared.

Nothing is now more easy than to give an explanation of the different properties which the two varieties of hydroxide of magnesium just mentioned, present; there is between these two compounds the same difference as between lime spontaneously slacked in the air, and lime suddenly slaked by a sufficient quantity of water. Every one knows that the latter alone can be employed in masonry, because it alone is susceptible of producing solidifiable mortars. Is it necessary to observe that lime spontaneously slaked in the air is analogous to English hydroxide of magnesium and that ordinary slaked lime is analogous to hydroxide of magnesium, prepared immediately? No; doubtless. But, perhaps, it will be asked of me, how do you conceive that magnesia can be hydrated in the air, without evidently absorbing carbonic acid? This is, because it is not true that oxide of magnesium has as much affinity for this acid as chemical books would lead us to believe; it is because this metallic oxide has a much greater affinity for water than for carbonic acid. Its affinity is even so small that calcined magnesia, kept in a dry place, may be preserved in tact for several years, as I had an opportunity of proving, in 1829, at the Pharmacie Central, in concert with M. O. Henry. I will say more: having passed a current of carbonic acid over dry oxide of magnesium, the proportion of carbonic acid absorbed was entirely inapplicable. Thus, it is certain, that calcined magnesia has a much greater affinity for water than for carbonic acid; it is quite as certain that this base absorbs carbonic acid only after having passed to the state of hydrate, and that, even then, this absorption is infinitely less than had previously been supposed. The same phenomenon is presented with lime; this

base has also a greater affinity for water than for carbonic acid. This explains how it occurs that we never find the lime in mortars saturated with carbonic acid, however old they may be, as M. D'Arcet has proved.

There is between lime and magnesia an analogy of chemical actions, which has not sufficiently attracted the attention of chemists, and which has long been impressed on my mind. The following is what I said of it in 1828, in my little work on the solidification of balsam of copabia by magnesia:—

“It is necessary to prolong the calcination of the magnesia until this metallic oxide is almost insoluble in the acids; in this state its causticity is extreme; put on the hand, it burns it almost as promptly as oxide of calcium.”

Thus, then, it is to my mind indisputably demonstrated that there exists between magnesia and lime an extremely great analogy of chemical properties. There is a caustic magnesia, a quick magnesia, as there is a caustic lime and a quick lime; and there exists a slaked magnesia, just as there exists a slaked lime.

The chemical considerations which I have just made known, which are not very important at first sight, acquire a different interest when examined in a therapeutical point of view; this is because caustic or quick magnesia, and hydrated or slaked magnesia, present very different medical properties.

Caustic magnesia, like caustic lime, can never be employed in medicine, at least in a high dose; but, on the other hand, it is the only preparation of magnesia suitable for solidifying balsam of copabia. I know that several samples of balsam of copabia have been unjustly regarded as bad, and discarded as such, and this because the magnesia employed for testing it was hydrated, and consequently, improper for the purpose.

The following is my reason for saying that caustic magnesia should never be employed in a high dose:—First, because it is more difficultly soluble in the acids of the stomach

than hydrated magnesia, but especially because, having the property of combining with water, of being able to solidify ten times its own weight, it results that when it is introduced into the stomach in a large dose, from eight to sixteen grammes, for example, this oxide appropriates to itself the liquids contained in that organ, renders them solid, and dries the mucous membrane, which is found in some measure masticated by the hydrate of magnesia produced in this case. Hence the explanation of the thirst which always more or less accompanies the administration of a large dose of caustic magnesia; hence also the explanation of that pinching, of that species of organic tenesmus which the patient always suffer when they neglect to drink large draughts of water after swallowing it.

This pathological state, occasioned by the employment of caustic magnesia, is so marked in certain persons that they are forced to suspend its use.

Thus, for example, I have, from Dr. Emery, the calcined magnesia, which he has been obliged to renounce on account of the indisposition caused by taken it, and to substitute for it the hydrocarbonate, which did not produce the same effect. Which difference of action that skilful practitioner explains by admitting in anhydrous oxide of magnesium the presence of a certain quantity of caustic alkali, potassa, or soda in the free state, but which is very certainly attributable to the magnesia itself.

From the foregoing, it indisputably results that practitioners will do well to renounce the use of recently calcined magnesia, and to substitute for it, not the hydrocarbonate of the shops, but, indeed, hydrated or slaked magnesia, that is to say, the hydroxide of magnesia obtained spontaneously in the air, like that which comes to us from England. Now, although a slight variation in the dose of a substance is innocent, as magnesia cannot bring about any bad result, it is, however, more rational to adopt the medical employment of magnesia in invariable proportions; that which ap-



pears to me to combine all the desirable conditions, that which especially, is most convenient for preparing purgative draughts of magnesia, well lies, and very homogeneous, is that formed of four parts of oxide of magnesium, and one part of water. This hydrate will, therefore, be designated under the name of magnesia hydrated to one-fifth, as magnesia slaked with one-fifth.

The hydrate of magnesia of which I speak is, I repeat, best suited for the preparation of the medicine of magnesia; and, as in this respect, I give it an exclusive preference over all other varieties of calcined magnesia. The following is my formula for this kind of medicine:—

*Medicine of Magnesia, or White Medicine.*

<b>R</b> Magnesia hydrated to 1-5th,	8
Sugar syrup,	80
Orange flower water.	20

This medicine should be taken at one dose in the morning, fasting, and immediately after its administration half a glass of cold water should be drunk, but not more, experience having taught me that taking too much liquid weakens its purgative action, which is owing to a portion of the magnesia passing the pylorus, and, consequently, escaping the solvent action of the acids of the gastric juice and the lactic acids, produced by the stomachal digestion of the sugar.

The medicine of magnesia prepared according to my formula, is more active than that obtained by the following, the formula which M. Goble has proposed to substitute for it, as I have ascertained by chemical experiments, which is, doubtless, owing to the latter containing an infinitely smaller quantity of sugar.

These effects of the medicine of magnesia are constant; it is only in a few subjects enfeebled, and incapable of supporting any nourishment, that I have known it necessary; it is the purgative of people who digest. This purgative

ordinarily acts only five or six hours after it is taken, rarely after, more rarely before.

As the action of the magnesia is slow in appearing, it is well to observe here that it is not necessary to await its effects to take food; it may be taken, without inconvenience, three hours after its administration.—*Ibid.*

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ART. LX.—ON THE ALTERATIONS AND ADULTERATIONS  
OF ALIMENTARY SUBSTANCES.

BY A. CHEVALLIER.

THE following petition was addressed by M. Chevallier to the Chamber of Peers and the Chamber of Deputies; but the Session was terminated without its having been made the subject of a report as to the measures to be taken for the prevention of the frauds specified in it:

*To the Members of the Chamber of Peers, and to the  
Members of the Chamber of Deputies.*

GENTLEMEN,—Before determining to avail myself of the right of petition, which belongs to every citizen, and before resolving on disturbing your numerous and important occupations, I have considered it my duty to ask myself whether the abuses which I think it my duty to lay before you were serious—whether they were of a nature to injure commerce—whether they might compromise the life and health of mankind—finally, whether they deserve special attention.

The serious examination which I have made of every

thing relating to the adulteration of commercial and alimentary substances, has shown me that the necessity for a prompt and severe repression of these frauds should fix your attention. Indeed, the adulteration of commercial products is so injurious to our foreign commerce, since, in consequence of the succession of frauds which are practised in the preparation and manipulation of various products, these products are rejected at foreign places of commerce, whence it results that our artisans lose their work, and our merchants their reputation, and that they do not derive the benefit they might hope for from the practice of their profession if it were legitimately exercised.

In the second place, the aliments, drinks and condiments, destined to sustain the life of man, and to supply the wants of their daily existence, are the subjects of frauds which may, in a great number of cases, injure the health of those who use them, but which in all cases have for their object the substitution of a cheaper for a more expensive product.

According to this explanation, commercial frauds, and the adulterations of alimentary and condimentary substances being in the highest degree injurious to the health and interests of the population, and to the prosperity of commerce, we think that it becomes indispensable that a law be made to prohibit existing frauds, and to prevent those which are daily springing up.

In our opinion, in such a law, the simple adulteration of a substance by a product of less value should be considered as a daring theft, which we do not notice, and which is daily renewed, because we are on our guard against the ordinary theft, whilst no precaution is taken against a tradesman who may cheat every day. This deception, when it is practised on the middle classes, is prejudicial to them, but it is much more so to the workmen, since those who exercise it deprive them by fraud of part of their laboriously-earned wages.

In some cases, applicable only to the healing art, adulterators are, in my opinion, guilty of the crime of *voluntary homicide*, in substituting inert for active products which might determine a revulsion by which the patient might be saved. We will mention, as an example, the adulteration of the farina of mustard with the farina of the cakes arising from the manufacture of oil of colza.

We will leave to men of high merit, and who have recently given their opinion concerning commercial frauds, and the *marques des fabriques*, the task of informing you what are the commercial frauds which injure the prosperity of our commerce and our industry; we will only make known to you that which we have observed relative to the sale of alimentary substances, drinks and condiments—substances which are indispensable, and to which we wish to call your attention.

The frauds of alimentary substances have been proved as follows:—

#### 1.—*Of Flour destined for the preparation of Bread.*

It has been ascertained that the flours sold, as being of good quality, were altered, and that they had undergone an acid fermentation; that others were adulterated with potato-secula, others with farina prepared with legumens bitten by insects, and which could not be sold without being altered in form; powder of alabaster has been mixed with flour; the fraud has even been carried to such a point that mineral substances, reduced to the state of powder, have been offered *in the market* in the Department of the Seine, to be mixed with flour.

We do not think that the addition of secula to farina can be injurious to health, but it is a robbery on the part of the vender against the baker; for secula introduced into farina, and made into bread, *as farina is*, does not absorb water, and does not yield so much bread as farina; it is a

robbery against the consumer, if bread prepared with farina mixed with fecula, and which contains less gluten, is, as many scientific men think, less nutritious; it is a robbery, especially injurious to the workmen, who cannot, like the rich, like men in easy circumstances, eat as much meat as they will.

We are convinced that a white, savory, and wholesome bread might be prepared with fecula and wheat flour in the proportion of 25 to 50 per cent. of farina to from 50 to 75 of fecula, which might be sold at a lower price than bread made of pure wheat-flour, but the composition of this bread should be notified by the maker and sold at its real value.

## 2.—Of Bread.

The frauds in this article of food are happily much more rare in France than in a neighboring country (Belgium,) where the sulphates of copper and zinc are added to the paste, in consequence of the erroneous idea that the addition of these salts gives rise to a more considerable production of bread.\* This culpable adulteration was, for some time, practised in France, but it has been totally abandoned for some years.

It is a positive fact that *baked potatoes* are used in the preparation of bread, and that a patent has recently been sold for the application already made of this mode of panification.

We do not think that the Administration can forbid him who prepares bread for his own use to introduce into it any substances he pleases; but we think that the Administration should not tolerate in Paris the introduction, by the baker, of any substance whatever into the bread sold for public

\* The Court of Appeal at Brussels, M. Espital, President, has confirmed the sentence which condemned a baker, named Pennincky, to two years' imprisonment, and a fine of 200 florins of the Low Countries, and deprived him of his *right of patent*, for having introduced sulphate of copper into the bread which he prepared.



consumption ; indeed, in the capital bread is taxed, and the tax is based *on the employment by the manufacturer of pure farinas, and not of other substances, whatever they may be, even if superior to farina, which is not the case.*

If a baker has discovered a process, or if a process of manufacturing bread be communicated to him, which is economical, he should not make use of it except with the authority of the Administration, which should judge of the wholesomeness of this process, and which must then study the public interest.

This process, put in practice, might have the advantage of reducing the price of bread, and it is known, according to M. Chabrol *that the diminution of 10 centimes per kilogramme of bread is of high importance* to the poorer classes inhabiting the capital. Indeed, that learned Minister has proved *that by admitting that there exists in Paris 500,000 consumers of bread of the poorer class, 5 centimes per day increase in their expenses in the purchase of bread would give, per annum, a sum of 9,125,000 francs.*

If we suppose that by economical and wholesome processes, a diminution of 10 centimes per kilogramme of bread could be obtained, *this aliment being as nutritive*, an annual saving of 9,125,000 francs to the poorer classes would be effected.

The proportion of water contained in bread sold for consumption merits, we think, all the attention of the Administration ; indeed, a loaf of 2 kilogrammes, which will weigh only this weight, may represent more nutritive matter than a loaf in which the 2 kilogrammes are complete ; in the one, the water has been evaporated by baking ; in the [other, the water has not been able to volatilise, and adds to the weight.

The legal exercise of the trade of baker in Paris deserves the attention of the authorities, for it is difficult ; indeed, he who exercises it is always suspected, even when he is honest ; the probity of the baker is not believed, and he has

always been represented as committing fraud. It is extraordinary, that when insurrection disturbed the streets, the bakers did not fall victims to a reputation which some of them may merit, but which should not be imputed to the greater number of them.

A just and severe law should severely punish the man who, charged with furnishing us with an indispensable aliment, wilfully deceives us; but this law should be based on regular studies and practical facts; its execution should also be made in an ostensible manner. Thus, a profession would be relieved, so that an honest man who exercises it may not run the same risks as one who enriches himself by daily delinquencies, an unfortunate result, since it puts the honest man and the rogue on the same level, also, the honest man is injured by the rogue, who reproaches him with what he calls his *ingenuity*.

### 3.—Of Meat.

This aliment is sometimes sold of false weight, and at other times it is spoiled when put up for sale. Our observations on the sale of spoiled meat have most frequently regarded meats which have been cooked.

### 4.—Of Milk.

Nine-tenths of the milk sold in Paris is diluted with one-third of water, to which, for some time, a little cassonade or caramel has been added; finally, bicarbonate of soda to prevent the milk from turning.

Some years ago, farina, fecula, rice-flour and gum, were employed for adulterating milk; it appears that these substances have been abandoned by adulterators.

The adulteration of milk in Paris would be difficult to repress, because the poorer classes are in the habit of paying for milk less than its value. It would be indispensable, before seeking to suppress this fraud, to make the public com-

prehend that they would be obliged to pay one-third more for milk than is paid at present, and that it is obtained at a low price only because it contains at least one-third of water and only two-thirds of milk. The population have been wrongfully disgusted by the publication of statements that milk has been prepared with the brain of animals, and especially with that of horses killed at Montfaucon; all the investigations made with the view of ascertaining the truth of this statement have demonstrated the falsity of a fact advanced it is not known with what object.

### 5.—*Of Beer.*

The beer sold in Paris should be made only with the seeds of cereals, properly prepared, and with hops. It is known, however, that a portion of this drink is the result of an operation into which enters, instead of malted barley, syrup of fecula, which sometimes contains a salt of copper, and that the hop is sometimes replaced by leaves of box and menianthe.

It would be, in my opinion, easy to suppress these frauds, since the brewers who commit them are liable in a fiscal point of view, by persons employed in the Administration, who might give useful information concerning these unwholesome preparations.\*

### 6.—*Of Culinary Salt.*

Common salt—that indispensable condiment which enters into the preparation of our food—has been the subject of numerous frauds, which have been partially suppressed, but not totally.†

\* We are assured that in France, as in England, substances of extreme activity are employed for giving bitterness to beer! but hitherto the truth of this assertion has not been demonstrated to us.

† The endeavors made by the orders of the Prefect of Police to suppress this fraud have been immense; the members of the Council of Health have submitted to chemical analysis more than 4,000 samples of salt, and yet it is still adulterated.

Salt has been mixed:—1st, with crude plaster (plaster-stone reduced to powder,) and this adulteration was so great in Paris that an establishment was fitted up by a manufacturer for the pulverisation of this stone, which was afterwards sold in commerce under the name of *powder to be mixed with salt*; 2nd, with granite reduced to powder; 3rd, with salts of varech and salts of every kind arising from various manufactures of chemical products. It must be remembered that, in 1827, an epidemic, which attacked more than 400 persons, was caused by culinary salt sold in the department of Marne. This salt was subjected to several experiments, and it was discovered that it contained iodides and arsenic. It was not known at first to what to attribute the presence of arsenic in this salt; but it was learned some time afterwards that this salt had given rise to these accidents arising from a manufactory in which salts of varech were refined, destined to be mixed with refined common salt. Similar salt was sold in Paris, and rendered ill a family named Pymor. This salt caused swelling of the face, pains in the head, ardent thirst, inflammation amygdalæ of the  $\alpha$ , and intolerable pains in the course of the stomach and intestines, followed by a diarrhœal flux, almost always sanguinolent.

The mixture of salts arising from manufactures with alimentary salt, may present very great danger. The *Presse* of December 17, 1843, states that, at the Hague, more than eighty persons were poisoned by using, for seasoning their food, salt procured from a manufactory at which it was sold for a very low price. Experiments demonstrated that this salt contained an arsenical preparation.\*

White salt has been mixed with salts of varech and with

\* A letter from M. Wrydag Zinem, pharmacien at the Hague, has since informed us that the salt sold at the Hague had been mixed with arsenic by the grocer's servant, with the object of driving away the customers from his master's shop in order that he might have the less work to do.

the salt resulting from the extraction of saltpetre. Some of these salts contained a compound of copper arising from the boilers in which these products were evaporated. *We have seen* white salt destined for the soldiers; this salt was salt of varech, which was reduced to small grains by passing through a sieve of copper-wire, covered with verdigris.

#### 7.—*Of Fecula.*

Fecula is mixed with the carbonate of lime. Quite recently we have found some which was mixed with alabaster, arising from the manufacture of pendulums and various objects of art. The proportions of powder of alabaster, added to fecula, have been ascertained to be from six to seven per cent. This fecula was, however, contained in bags bearing a printed label as follows:—"Potato-fecula, purified for alimentary use and for children."\*

#### 8.—*Of Sugar.*

Sugar has been adulterated with sugar of fecula, earthy matter and sugar of milk. These substances are not, it is true, injurious to health; but they are cheaper than the sugar for which they are substituted.†

#### 9.—*Of Chocolate.*

The chocolate sold in Paris is often mixed with fecula, farinas and sometimes with an inert powder prepared by bruising cocoa-nut shells. These substances are inert it is true; but we should not buy the chocolate containing them if we were informed of the fact by the label.

\* The Administration having knowledge of this fact, because *Sieur R.*, manufacturer of objects of alabaster, had offered his powder at various establishments, to merchants of good faith, the Prefect of Police ordered investigations on the subject.

† This fraud had attained such a height, that enormous masses of ice were manufactured to be mixed with sugar.



A fact which proves the adulteration of chocolate is that this product is sold below the market price ; however, the manufacturer should have this profit on the sale.\*

#### 10.—*Of Honey.*

Honey is adulterated with fecula and syrup of fecula. We have seen honey prepared with syrup of fecula, which had become solid in the barrel, so that the grocer who had bought it did not know what to do with the product, which, owing to its solidity, could not be sold to the public.

#### 11.—*Of Colored Sweetmeats.*

Colored sweetmeats, bonbons, and lozenges have long been the subjects of serious apprehensions to the Government ; saccharine matters intended for children have been colored with arsenite of copper, with gamboge, with vermillion, with blue ashes, with chromate of lead, and with red lead ; liquors owe their green color to a salt of copper. The limited number of manufacturers has enabled the Government to take measures which have been effectual. These measures consist in causing the shops and manufactories, where these sweetmeats are prepared, to be visited, and in causing the substances employed to be analysed by members of the Council of Health of the Department of the Seine. These members, besides these visits, give, throughout the year, gratuitous advice to the confectioners who wish to employ new coloring matters. It is in consequence

\* The following statement was made by a manufacturer who sold chocolate at 70 centimes the  $\frac{1}{2}$  kilogramme, and from whom a sample of chocolate of inferior quality was taken :—"I do not think that a worse quality of chocolate could be manufactured. This manufacture is disgraceful to commerce, and I make it only in my own defence and to sustain competition. I have but one regret, which is, that the Government has not the power to oppose this pitiful manufacture, which consists, simply of making chocolate with the last residues of cocoa. (He might have added, with the addition of fecula.) As we descend in the quality of bread, to preparing it with bran for animals."

of this measure that we have known that a color manufacturer sold to a confectioner for factitious ultramarine, an inoffensive blue color, a poisonous mixture, formed of 60 per cent. of ultramarine and 40 per cent. of blue ashes, carbonate of copper.

#### 12.—*Of Salad Oil.*

Olive oil is daily adulterated with an oil known by the names of white oil and oil of carnations, which is of less value, and whose quality is not the same.

To give mixed oils the appearance of olive oil, solid fatty matters are often added, which give them the appearance of olive oil rendered concrete by cold.

#### 13.—*Of Cider.*

The cider sold in Paris is rarely pure; fermented liquors prepared with sugar of fecula, cassonade, and vinegar, are substituted for it; every kind of it is prepared with dry fruits, or else it is prepared in vessels which render it injurious: we have seen cider containing lead give rise to more or less serious symptoms.

We have seen sold, and even in the interior of the casernes, *under the name of cider*, liquids which merited a serious attention on the part of the military authorities. By the sale of these liquids, the soldier is, in the first place, deceived in the value of the product, and is also liable to be rendered more or less dangerously ill: this so called cider contains a small quantity of a salt of copper.

#### 14.—*Of Coffee.*

Coffee, which is a necessary morning aliment to a great number of the poorer classes, is often the subject of numerous frauds. Coffees which have been thrown into the sea are taken up, worked, and then sold in commerce with coffees of good quality. Coffee of good quality, when

ground, is adulterated with—1st, exhausted coffee, which has been collected and dried; 2nd, with powders, obtained by torrefying various products, roots of chicory, beet-root, carrot, the seeds of peas, pointed peas, rye, &c., &c. All these products are not injurious to health, but they are sold for that which they are not, and as substitutes for a product of greater value. There is no chicory which has not been the subject of fraud; this product, intended to be mixed with coffee, has been adulterated in its turn. Thus, there is sold in commerce as chiefly coffee—1st, a product resulting from a mixture of exhausted coffee and torrefied bread; 2nd, a product resulting from a mixture of chicory, coffee, and animal charcoal, arising from the decoloration of sugars, *a residue of the refineries*. We will here call to mind that, in the course of legal proceedings carried on between the Sieurs L. and D., it was proved that one of the brothers, L., a merchant, had come to Paris to collect various residues; the powder of semoule, and the residue of vermicelli, which should be dyed and mixed with chicory coffee, but that having ascertained that this product did not present the advantage which he had hoped for, he put himself in connexion with the lemonade boys, and for two months employed a man and a cart to collect all the coffee grounds which had been preserved at his request.

#### 15.—Of Wines.

The wines sold at Paris, by retail, are, in general, wines produced by the mixture of several crude products. But this mixture is not a fraud; the fraud practised consists in mixing with the southern wines, which contain a great quantity of alcohol, water, acidulated either with vinegar or with tartaric acid; sometimes, instead of water, dry fruits, are macerated, and the liquor added, and these mixtures are colored with juices prepared with different matters, and especially with elderberries. Formerly, the wine

which became sour was saturated and sweetened with oxide of lead, litharge, according to the process of Martin le Bavaois; now this dangerous saturation is almost abandoned: we had an opportunity of noticing it, however, some years ago, at Compiègne; several soldiers of the camp were taken ill; the cause of their illness was investigated, and it was ascertained that this cause was attributable to the use of a green wine, which had been sweetened with acetate of lead; the vintner, who had bought from a druggist the acetate which he introduced into his wine, was brought before the tribunal, and convicted.

Wine is also, in some cases, mixed with alum, with the view of rendering it clearer and more limpid.\*

#### 16.—Of Brandies.

The brandies sold by retail are most commonly mixed with alcohol of fecula and water, the whole colored by caramel; sometimes the brandies, owing to the impurity of the alcohol, and in consequence of negligence of the distillatory vessels, contain salts of copper injurious to health.†

#### 17.—Of Vinegar.

The vinegar sold at Paris is still, notwithstanding the surveillance of those who sell it by retail, mixed with foreign substances; this acid which the poor employ as a condiment in the aliments of which they make daily use, is

\* It should be called to mind—1st. That some months ago, the Sieur R., proceeded before the tribunals against a company against the sale of a process, by aid of which a portion of wine was doubled without increase of price. 2nd. That two musicians, dealers in wines, were condemned to three months' imprisonment, and to a fine of 200 francs by the 7th Chamber, for having manufactured with water, vinegar, southern wine, and campeachy wood, a liquid which they had sold as wine. We have just detected in wines the presence of a salt of copper, arising, in our opinion, from alcohol containing a salt of copper having been added to it.

† We have seen alcohol containing 30 centigrammes of acetate of copper to one quart of brandy.

mixed with 1st. Sulphuric acid; and this adulteration is proved every year in Paris. 2nd. With water in the proportion of one-third or one-half; in the latter case the product is not injurious to health, but then the purchaser pays 60 centimes the litre for a liquid which should cost only 30 or 40 centimes. 3rd. With water acidulated by tartaric acid; the buyer in this case is also deceived in the value of the product.

Besides the wine-vinegar sold at Paris, vinegars are manufactured in that capital *with syrup of secula, with the washing waters of the sugar forms called waters of bac, with wine-leys, and with bacquetures collected under the counters of wine merchants.* None of these vinegars can be compared, as regards taste and acidity, with wine-vinegar. In our opinion, they should be sold only for what they are, and under the names of *vinegars of syrup of secula, of waters of bac, of wine-leys, and of bacquetures.*

This last vinegar, the vinegar of bacquetures, most frequently contains a salt of lead; sometimes, but rarely, the presence of a salt of copper has been detected.

#### 18.—Of Tea.

Tea is adulterated like all other substances; tea of good quality has been mixed with tea which has been used, which has been collected, and which is rolled by suitable means. Teas are colored with indigo and with prussian blue.

In August, 1844, the Administration was informed that a certain quantity of tea derived from an English ship called the *Reliance*, which had suffered shipwreck on the coast of France, was fished up again, washed with water to free it from the sea salt, then colored green by a mixture of indigo, talc, and chromate of lead, and passed into commerce.

The persons who committed that fraud were a merchant and a working man. At first the correctional police sen-



tenced them to pay a fine of 50 francs, and to be imprisoned for 8 days; but an appeal being made, the merchant was acquitted; the Royal Court, considering that if A. did subject the damaged tea to a treatment to render it saleable, this is no proof of any fraud with reference to the quality of the merchandize sold.

In consequence of this acquittal, the tea still covered with the chromate of lead, a poisonous salt, which might prove injurious to the animal economy, was restored to Mr. A. It is to be regretted that the Administration did not order that, previous to restoring the tea, it should be washed to remove the chromate of lead.

It is probable that tea colored with the chromate, indigo, and talc, are at present circulating in commerce. It must be remarked here, that this fraud with tea was not only practised in the metropolis, but at the moment when the tea colored by chromate of lead was the subject of an investigation at Paris, M. Merchand, pharmacien in Fécamp, found that tea sold in that town was likewise colored by the same process.\*

In addition to this, we could quote a great number of other substances constituting articles of food with which more or less heavy frauds are practised; but we think that the facts above related clearly prove the necessity of a law being enacted with reference to the sale of alimentary substances and spices—a law which would prevent not only the frauds quoted above, but those likewise which I have passed over in silence. This law would have the advantage of protecting the health, as well as the interests, of the citizens.

\* At the same time when the subject was inquired into at Paris, the excise authorities in London seized upon a manufacture of sophisticated tea, one ton of which, having already been used, was worked upon. Shortly previous to that time, a tea merchant of London was sentenced to pay a fine of 200 pounds sterling. This fine did not dishearten the defrauders, which proves that this fraud must be very profitable.

Before quitting this subject, we deem it proper to inform those who may think that the existing laws are sufficient to prevent delinquencies of this kind, that this is not the case: the Article 318 of the Penal Code says:—"That whoever has sold, or offered for sale, sophisticated beverages, containing mixtures injurious to health, shall be imprisoned for the term of from six days to two years, and fined from 16 to 500 francs;" but this article does not extend to such defrauders as mixed plaster of Paris with salt; alabaster with fecula; fecula sugar with cane sugar and honey, water with vinegar, &c., &c. For they may plead—1st. That these substances are not injurious to health. 2nd. That they neither sold nor offered for sale the mixed substances found upon their premises. Is it, then, necessary for the purpose of making application of this law, to have recourse to artifices to prove the sale? We feel indignant at dealings of this kind, both in behalf of the jurisdiction and of the administration. The Article 475 of the Penal Code fines, in the sum of 16 francs, such as have sold *falsified beverages*; in this case as in the preceding one, if the falsified merchandise be seized upon the premises, the defendant will not always forfeit the fine, because he may allege that he did not sell.

The Article 423 runs as follows:—"Whoever imposes upon a purchaser with reference to the standard of articles made of gold or silver; the quality of a spurious stone sold for a fine one; the nature of any merchandise; and whoever makes use of false weights, &c., shall be sent to prison for the term of from three months to one year, and fined in a sum which may amount to one-fourth of the value.

It would appear that in no case the administration is in a position to prevent the fraud. It is known that a man sold a certain quantity of salt which is injurious to health; some salt similar to that sold is seized upon his premises: has he not a right to maintain that he did not sell this salt?

We have witnessed several times cases in which the tribunals acquitted the defaulters, regretting that the law made no provisions empowering them to inflict penalties.

*Ibid.*

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ART. LXI.—PURIFICATION OF GUM RESINS BY MEANS OF DISTILLED WATER AND ESSENTIAL OIL OF TURPENTINE.

By M. LAMOTHE.

VARIOUS media have been successively employed for the purification of the gum-resins. Baumé recommends dissolving them in vinegar; the old French Codex substitutes white wine for vinegar; that of 1818, weak alcohol for the white wine; and in the preparation of *Empl. Conii*, it orders vinegar of squills and hemlock juice for dissolving the gum-ammoniac. The late M. Henri, in his lectures at the Pharmacie Centrale, likewise suggested weak alcohol as the best solvent; a method which has generally been adopted, and which is prescribed in the new Codex.

I confess that alcohol affords an homogeneous product well adapted for being incorporated in plasters; but if the length of time required for the operation be taken into consideration, the expense of the alcohol, which, notwithstanding the care of the operator, is for the greater part dissipated, and the quantity of the liquid requisite for dissolving completely the gum-resins, the preference will be given to the process which I have employed for sixteen years in my laboratory; a process which is less expensive, more expeditious, and affords equally good products:—

**R** Gum-ammoniac, or any other gum-resin, 1 part.  
Distilled water, 4 parts.

Macerate for 12 hours in a tinned copper basin, agitating now and then with a wooden spatula; at the end of this time expose the mixture for some minutes to a temperature of  $158^{\circ}$  to  $168^{\circ}$ , strain through linen with slight pressure, treat the residue with a fresh quantity of distilled water and express, and subject it to a third and even to a fourth digestion, each time in 2 parts of distilled water. There remains a tenacious pitchy magma, which is exposed to a gentle heat in half a part of essential oil of turpentine and as much distilled water; the latter to dissolve the gummy portion, the former to dissolve the resin; strain with pressure. If the residue is not entirely exhausted, place it again over the fire with a fresh quantity of essential oil and water; mix all the liquids, and evaporate in the water-bath until all moisture is driven off, stirring constantly.

*Chem. Gaz. from Journ. de Pharm.*

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ART. LXII.—ON THE PREPARATION OF THE VALERIANATE OF ZINC, AND ITS MEDICINAL EMPLOYMENT.

THE valerianate of zinc, first proposed by Prince Louis Lucien Bonaparte as a medicine of considerable value, has for some years occupied an important place in the therapeutics of the Italian physicians. Dr. F. Devay, physician to the Hotel Dieu of Lyons, has recently made numerous experiments with this substance, the remarkable results of which have excited the attention of French practitioners to a high degree; and the valerianate of zinc has all at once got into great favor, so much so that for some weeks this salt is constantly being prepared by the principal pharmacutists of Paris.

Under these circumstances, a review of what has been published relating to the valerianate of zinc will undoubtedly interest many of our readers. Valerianic acid, discovered by Planche, was isolated by Grote, and was investigated by Penz. It pre-exists in the root of valerian, but it may likewise be readily produced by acting with caustic potash on potato fusel oil. It is a volatile fat acid, colorless, soluble in every proportion in alcohol and æther, and soluble in about 30 times its weight of water. To obtain it, the valerian root is distilled until the product has no longer an acid reaction; the essential oil which floats on the surface of the distilled water is separated, and the acid which it retains removed by shaking it with solution of caustic potash; the distilled water is saturated with carbonate of potash, the liquids mixed, and then evaporated to dryness at a very gentle heat; the residue, introduced into a retort and distilled with a suitable proportion of dilute sulphuric acid, affords a saturated aqueous solution of valerianic acid, on which some pure valerianic acid floats. Two pounds of valerian root afford about 2 grms. of acid.

To convert it into valerianate of zinc, it is saturated with the carbonate, or still better with perfectly pure oxide of zinc recently precipitated. The action is assisted by heat, the hot solution filtered and allowed to crystallize on a gently heated sand-bath. The crystals form light nacreous laminæ of a brilliant white colour. According to M. Duclos, cold water dissolves one-fiftieth of its weight and boiling water one-fortieth. It is scarcely soluble in æther, but 100 parts of boiling alcohol dissolve 6 parts.

Valerianate of zinc was recommended as an antispasmodic, and the experiments of Dr. Devay were undertaken to determine its value as such. The results which he obtained have been remarkable from the quickness and completeness of the cures. The physiological effects are scarcely more decided than those of the valerian or of the zinc taken separately. A dose of 2½ grs., which is sufficient to subdue



an attack of neuralgia or moderate the paroxysm of a violent megrim, produces in the healthy state but a little cephalalgia, slight vertigo, and a little confusion of hearing. It is particularly in the case of *tic-doulooureux*, which cannot be subdued by the ordinary antispasmodics, that Dr. Devay has confirmed the efficacy of the valerianate of zinc; he has likewise applied it with success to the treatment of some other analogous affections, such as nervous headache, violent megrim, satyriasis, &c.

The following are the different forms in which he prescribes this remedy:—

Pills.—Valerianate of zinc,	9 grs.
Gum-tragacanth,	30 grs.

Make into 12 pills, one to be taken in the morning and one in the evening.

Powder.—Pulverized valerianate of zinc,	9 grs.
“ sugar,	45 grs.

Mix, and divide into 24 packets, of which from 1 to 4 should be given daily according to circumstances.

Draught.—Distilled water,	5 drms. 20 drops.
Valerianate of zinc,	1½ gr.
Simple syrup,	1 oz.

A spoonful every half hour.

*Ibid., from Ibid.*

## ART. LXIII.—ON A NEW METHOD OF PREPARING IODIDE OF POTASSIUM. By R. PHILLIPS, JUN.

IN examining six samples of iodide of potassium, procured at different chemists, the author found that No. 1 was strongly alkaline, and contained water, iodate of potash and chloride of potassium or sodium; No. 2 resembled No. 1, except that it contained a larger quantity of iodate; No. 3 was slightly alkaline, contained no water, but a trace of an iodate and chloride; No. 4 resembled No. 1; No. 5 was almost pure, containing only a trace of iodate and water; No. 6 resembled No. 1. The author proposes the decomposition of the iodide with nitrate of silver, washing the precipitate with distilled water, and then digestion in strong solution of ammonia, as a readier and better process for detecting the adulteration with a chloride than the method in general use. If the filtered ammoniacal solution, acidified with nitric acid, give a white precipitate, it is chloride of silver, and denotes the presence of a chloride of potassium and sodium. In testing for iodate of potash, the solution of the iodide in cold distilled water is to be acidulated with tartaric acid, and a solution of starch added; if the mixture does not become of a dark color, no iodate is present.

The author's process consists in decomposing the iodate of potash formed by the action of iodine on potash by protoxide of iron. The usual method, viz., fusion of the iodide so as to decompose the iodate, is objectionable, because a heat which is sufficient to decompose the iodate renders the iodide volatile. The protoxide of iron is easily prepared by precipitation with the alkalies from the protosulphate of iron. The precipitate must be washed by decantation, until chloride of barium causes no precipitate in the water. Peroxide of iron being a sesquioxide, it is necessary, in

order that the whole of the iodate may be decomposed, that for every atom of carbonate of potash used, there should be present 2 atoms of protoxide of iron. The quantities therefore should be 2 atoms or 280 parts of protosulphate of iron, which are to yield 2 atoms of protoxide, 1 atom or 125 parts of iodine, and 1 atom or 83.5 parts of carbonate of potash. On account, however, of the liability of the protoxide of iron to become peroxidized, it is better to take rather more of the protosulphate.

The protoxide, when washed, is to be mixed with the iodine and carbonate of potash, half a pint of water being used to an ounce of iodine. The mixture is at first to be gradually heated, and then boiled for half an hour. The solution afterwards ought to be exactly neutral to slightly redden litmus-paper; if iodine be in excess, more carbonate of potash must be added; if, on the contrary, it is alkaline, more protoxide of iron and iodine. The sesquioxide of iron remaining, after being well washed, may be heated red-hot for a few minutes; a beautifully pure preparation remains, which on account of its easy solubility in hydrochloric acid might be advantageously used in the preparation of the *Tr. Ferri Muriatis*.

*Ibid., from Ibid.*

ART. LXIV.—ON THE PRESENCE OF LEAD IN THE  
STATE OF OXIDE OR SALT IN VARIOUS ARTIFICIAL  
PRODUCTS.

By M. CHEVREUL.

I AM induced by several motives to publish some facts with reference to the presence of lead in the state of oxide or salt in various products of the arts, not because these facts of themselves are of great importance, but, on account of the many consequences which may be deduced from their knowledge, they present a certain interest.

I have had an opportunity afforded to me of pointing out to the Academy the inconvenience which may occur from treating woollen tissues with metallic matters, susceptible of producing with the sulphur which they naturally contain colored sulphurets, when these tissues are either to receive impressions on a white or light-colored ground, or to be dyed by similar colors, because under the influence of the heat or steam, or of the liquid serving as a dye bath, a colored sulphuret is formed spreading over all the portions of the tissues which are impregnated with the metallic matter. Some months back I was asked what might be the reason that the shawls woven in Picardy six months ago, on coming into contact with steam, became of a brown tint, even without having received any previous preparation. I soon found that the warp alone was colored, and as this was treated with isinglass, it appeared to me that the metallic matter was employed in the latter substance. Experiment confirmed my anticipation, for I discovered oxide of lead and a very little oxide of copper, not only in the sizing in the state in which it was employed, but likewise in the size itself from which this was prepared.

The proportion of the oxide of lead was so great, that the water in which the size was dissolved became strongly

colored by sulphuretted hydrogen. I succeeded in obtaining the lead in its metallic state from the incinerated matter. After this experiment I learned that the size was prepared in the environs of Lille, and that ceruse had been added to it; fortunately, it was not of a nature to be employed as an alimentary substance. The communication, however, of this fact is interesting to manufacturers of woollen tissues, and with the view to be useful to them I thought it proper to give it all possible publicity.

Some years ago I was asked by a laundress of Sèvres (Madame P——) whence came the brown stains which appeared when she washed, for the first time, shirts, handkerchiefs, &c., made of cotton cloth. The loss which she suffered by several accidents of the kind induced her to find out the cause of them, and she discovered that these cloths came from one of the first manufactories in France, the Parisian agent of which was one of her customers. She sent to me a specimen of some new cloth, together with some of the alkaline matter, employed by her as ley, and which she obtained at La Villette. I recognised the presence of sulphate of lead in the dressing of the cloth; and, finally, having found that this alkaline matter was a mixture of highly-sulphuretted soda, potassa and lime, I no longer doubted that the stains were produced by a reaction of the alkaline sulphurets on the sulphate of lead contained in the dressing. Without entering here into the question, how far cloth, impregnated with sulphate of lead, may be injurious to health, we think that the process of giving body and firmness to cloth by mixing sulphate of lead with the dressing ought by all means to be prohibited; and this is the more practicable, since, at present, for this purpose, in many establishments, sulphate of lime is employed without inconvenience.

I will make some remarks with reference to the investigation of metallic matters in human and animal bodies. In speaking of the boiling of the Dutch company (Compagnie



Hollandaise,) I quoted the experiments, from which it appeared to me that the copper which analysis may discover in animals or plants, is not to be considered as an essential element of their constitution. The quantity of this metal, though always very small, is variable, being sometimes altogether absent. If a cupreous salt penetrates the soil of vegetables by means of water, or a similar salt or cupreous powder penetrates with the food, or in any manner whatever the body of animals or of man, I consider this penetration as an accidental one. This is in conformity with the views expressed in my treatise on "*Matter considered as it exists in Living Beings*," in which I distinguished three classes of immediate principles—principles essential to the existence of beings; principles which, though necessary, are not essential, so that, if they are absent, others may supply their place, finally, accidental principles which, without inconvenience, may be absolutely absent. I placed lead and copper among the accidental principles of the organised beings.

I will now make some remarks with reference to the presence of this metal, deduced from analyses made under a circumstance of which I am about to speak. Having put some cloth, silk and wool, to be used in the demonstration of my course, (delivered last year at the Gobelins,) in water rendered alkaline, it was noticed with astonishment that the wool became brown in waters containing soda, baryta, strontia and lime, which were prepared for my experiments with perfectly pure alkali. I soon recognised the action of the oxide of lead under the influence of the alkali and sulphur of the wool, by the coloration of this latter body. But whence came the oxide which I found in the alkaline waters on treating them with sulphuretted hydrogen? It came from the flasks in which these waters were kept during several months, and it was evident that the glass of these flasks was a mixture of glass, properly so-called, and of lead-glass, called crystal. In the year 1828, I pointed out

the error to which crystal glass might lead in legal cases, in treating, as was then usual, matters suspected to contain arsenic with carbonaceous matters in glass tubes containing oxide of lead. (*Vide* my letter addressed to M. Lefrançais-Lalande, printed in a memoir of M. Guerre, Advocate at Lyons, for the defence of Mde. D. indicted for parricide.) The same fact, I mean the existence of oxide of lead in glass, might lead to an erroneous result, not only in medico-legal investigations, but in any research whatever. Hence, to obviate any possible error, I call to mind the discussion raised by several chemists, with reference to the presence of oxide of lead in reagents, and especially in potassa prepared by alcohol.

According to M. Dupasquier, of Lyons, known to the Academy by his interesting labors in several branches of chemistry, the potassa prepared with Alcohol, as sold by the manufacturers of chemical products at Paris, contains oxide of lead. According to M. Louyet, of Brussels, who investigated the absorption of deleterious substances by plants, the potassa prepared by alcohol by the firm of Robiquet, Boyveau, and Pelletier, is entirely free from them, containing, however, small quantities of alum, silica, and platinum.

Without pretending to obtrude myself as an arbitrator between MM. Dupasquier and Louyet, it evidently results from my own observations that alkalis, potassa, soda, baryta, strontia, and lime, though deprived of oxide of lead, on being kept dissolved in flasks of glass, containing lead, may dissolve a notable quantity of this oxide.

Finally, on terminating this note, I consider it useful to quote the following passage, extracted from a report laid before the Academy :—

“The frequent use made in our days of several poisonous compounds, as those of arsenic, copper, &c. &c., must excite our attention, for it is possible, for instance, that waters which have served to wash substances impregnated with arsenical compounds, might in some places have a pernicious

influence on animals. It is possible that the same effect might be produced by matters containing arsenic, which having been buried, and then disseminated by subterraneous waters, might be brought back again to the surface of the soil, at a distance from the place in which they were deposited."

The report in which the above passage is to be met with, was made by myself the 11th and 18th March, 1839, and the same year, being just then published, I read in the memoirs of the Royal Society of Sciences, Letters, and Arts of Nancy, for the year 1838, a note of M. Braconnot, superscribed, "On a circumstance which may cause error in the detection of arsenic."

Here follows the first part of this note:—"For about thirty years, during which a manufacturer of colored paper has prepared his colors with various mineral substances, several families living in the house adjoining his establishment have experienced in succession, with more or less intensity, the following symptoms:—headache, lassitude, nausea, painful digestion, almost continued colics, alvine dejections, swelling of the legs, discomfiture, and loss of spirits; in consequence of which affections, several members of these families died. Two years ago, new victims having suffered, a suspicion was raised that the water of the wells might contain some of the poisonous substances employed in the manufacture, but in the investigation which we then made, nothing was discovered, and the present inhabitants of this house continue to make use of the same water; they even sensibly recovered, but the above-mentioned symptoms manifested themselves with so much violence, that the case evidently appeared to be one of poisoning. M. Simonin and I were requested again to examine the water of this well, we then easily discovered the presence of arsenic associated with an alkali, alum, and a coloring matter."

M. Braconnot terminates his note by "earnestly inviting

the authorities charged with the public health, to superintend, with the greatest attention, manufactures of this kind."

Had I had any knowledge of the note of M. Braconnot at the time when I compiled the above quoted report, I should certainly not have failed to mention it as a most strongly corroborative proof of the statements in the passage quoted above.

#### *Conclusions.*

1st. It is evident that woollen tissues should not be put into contact with materials containing lead or copper, when they are destined to be exposed to steam or hot water, to preserve a white ground, or to receive light colors.

2nd. Woollen tissues, or size, which served for the sizing of their warp, and cloth tissues dressed with a preparation of lead, which gave rise to the phenomena signalled in the above note, on being subjected to the test of liquid sulphuretted hydrogen, which I proposed some years since, produce a striking coloration, and this agent, consequently, is qualified to obviate all the inconveniences which might result from the presence of oxide of lead.

3rd. In future, in all chemical or medico-legal researches in which the subject of investigation is lead or its compounds, it will, above all, be indispensable to subject the alkaline reagents to the proper experiments, to ascertain whether these latter bodies are free from oxide of lead, and whether they have received none from the glass vessels in which their solutions may have been put.—*The Chemist.*

## MINUTES OF THE PHARMACEUTICAL MEETINGS.

*April 1st, 1844.*

Professor CARSON in the Chair.

The minutes of the preceding meeting were read and adopted.

A communication from John H. Ecky, on "the Extract of Seneka and Squill," containing instructions as to the mode of preparing Compound Honey of Squill with it, was read and referred to Charles Ellis and Thomas P. James for examination.

An interesting discussion ensued relative to the several merits of honey and sugar in the preparation called Coxe's Hive Syrup, the Syrupus Scillæ Compositus of the U. S. P.

Professor Carson communicated some information relative to the "Matico" brought from Valparaiso. It possesses astringent and styptic properties.

*May 6th, 1844.*

Professor CARSON in the Chair.

The last minutes were read and adopted.

The Committee having in charge the paper of John H. Ecky, presented a report, which after consideration was returned to the committee for further action.

Professor Carson exhibited a specimen supposed to be genuine Socotrine Aloes of very fine quality; also an article obtained in Boston by Charles Ellis, under the name of "Gum Aceroides," the origin and nature of which are undetermined.

Edward Wayne exhibited several specimens of Copaiba which had been adulterated, as was supposed, with Venice turpentine; also a crystalline substance which had separated from *Ol. Monardæ Punctatæ*, obtained by distillation. The same member presented a specimen of Honey Locust,



(*Ceratenia siliqua*,) directed in the Prussian Pharmacopœia as an addition to *Syrupus Papaveris*.

*December 2d, 1844.*

CHARLES ELLIS, Vice President, in the Chair.

The preceding minutes were read and adopted.

The committee having in charge the paper of John H. Ecky, informed the meeting that they were not yet ready to report, the author having undertaken to re-examine the subject.

William Procter, Jr., presented specimens of the fruits of *Bixa orellana*, *Asclepias gigantea* and *morinda*, from Cienfuegos in Cuba, whence they were brought by J. G. Howard, Esq.

Charles Ellis called the attention of the meeting to the subject of fluid extract of senna, and exhibited a specimen of the preparation, in form a little less concentrated than that usually sold, one fluid ounce and a half, representing an ounce of Alexandria Senna. He stated, that from various sources he had heard complaints of the products furnished by the process published in the *Amer. Journ. Pharm.*, vol. xiii. p. 290, and he suggested whether the difficulty did not arise from the protracted heat necessary to effect the great degree of concentration to which the preparation was carried. Other members objected to the formula because of the impossibility of getting water to pass through after diluted alcohol, when the senna is well bruised. On comparing notes, it was found that some members employed India senna, and some the Alexandrian article, which was thought by Charles Ellis to account for the variableness before spoken of, he being decidedly of the opinion that the former is less active than the latter. In order to ascertain if this opinion be correct, William Procter, Jr., engaged to have extracts made with equal care from both kinds of senna, fairly tested in their cathartic power, and report at the next meeting, which was agreed to.

Then adjourned.

*January 6th, 1845.*

Professor BRIDGES in the Chair.

The minutes of the preceding meeting were read and adopted.

Reports of committees being in order, Charles Ellis on behalf of the committee appointed to consider the paper of John H. Ecky, read a communication from that gentleman detailing a careful repetition of his experiments, which has fully corroborated his first statements. On motion, it was agreed, that the original paper be published, with such additional remarks, as, in his last observations, the author intended to offer—and that the committee be discharged.

Prof. Carson read a paper on Matico, prepared by James L. Elliot, which was referred to William Procter, Jr., Ambrose Smith and A. J. Duhamel as reporters.

Prof. Carson informed the meeting that Matico had been employed in this city, and subsequently at the Naval Asylum at New York, with marked success, as an injection in mucous discharges; and that its *modus operandi* was peculiar. It possesses anti-hæmorrhagic powers. It is the product of the *Piper angustifolia*.

William Procter, Jr., in accordance with his engagement at the previous meeting, informed the members that he had prepared carefully an extract from each variety of senna, the only difference between them being, that the Alexandrian article was without aromatics, whilst the Indian had associated a small quantity of the oils of fennel and anise, each fluid ounce of extract representing an avoirdupois ounce of senna. Having provided the preparations, the next step was to get them fairly tested as to cathartic power, which was happily effected through the obliging attention of James N. Marks, the able pharmacist attached to the Philadelphia Hospital at Blockley, who reported as follows, viz.

CASE 1. 12mo. 16.—Wm. Murray, aged 48 years, at 14

o'clock, P. M., took 3vj. fluid Ext. *India* Senna, purged four times, at 7 and 10 o'clock evening, freely, and at 3 and 7 o'clock, morning, moderately.

12mo. 31.—Administered 3vj. Ext. *Alex.* Senna at 7 o'clock, morning, purged *five* times—at 12½, 1, 2, 7 o'clock, noon, and again at 7 in the morning of the 1st of January; states it purged much more actively than the first.

CASE 2. 12mo. 16.—Jonathan Tucker, aged 68 years, at 2½ o'clock, P. M., took 3vj. fluid Ext. *India* Senna, purged *four* times—at 7, 9 and 9½ o'clock, evening, and at 7 o'clock on the morning of 17th.

12mo. 30.—Administered 3vj. Ext. *Alex.* Senna at 2 o'clock, P. M., purged freely, *five* times, at 7, 7½, 8, 8½ and 9 o'clock; says it operated more actively than the Ext. of *India* Senna.

CASE 3. 12mo. 23.—Jas. McGovern, aged 59, at 1 o'clock, P. M., took 3vj. Ext. *India* Senna, purged *three* times, at 9 o'clock, evening, and 2 and 7 in morning of 24th; first operation large.

12mo. 30.—Administered 3vj. Ext. *Alex.* Senna at 2 o'clock, P. M., purged *four* times, at 8 and 10 in evening, and 1 and 7 on morning of 31st, all large; states it purged much more freely than the first.

CASE 4. 12mo. 23.—John Murphy, aged 40, at 1 o'clock, P. M. took 3vj. of Ext. *India* Senna; purged well, *three* times, at 7 and 8 o'clock, evening, and 6 o'clock on morning of 24th.

12mo. 30.—Administered 3vj. Ext. *Alex.* Senna; at 2, P. M. purged *four* times, all full, operations at 8 and 9, evening, and 1 and 7 o'clock on morning of 31st; says it purged him much more actively than the first, or *India* Senna purge.

CASE 5. 12mo. 23.—John S. Kelley, aged 35 years, took at 1 o'clock, P. M. 3vj. Ext. *India* Senna; purged *four* times, at 7, 8 and 8½ o'clock, evening, and 6 o'clock

on morning of 24th; first and second operations large, last two small.

12mo. 30.—Administered  $\mathfrak{z}\text{vj}$ . Ext. *Alex.* Senna at 2 o'clock, P. M.; purged very hard *five* times, at 7½, 8, 8½ and 12, night, and at 7 on morning of 31st; states the last purge to be much more powerful than the first.

From these observations, it appears conclusive that the Alexandrian variety possesses an activity superior to the Indian, and in making preparations where the quantity of senna is fixed, that the former should be employed.

In connection with this subject Professor Carson remarked that Dr. R. E. Griffith had informed him, that the leaflets of the *Cassia marilandica* when collected in the fall, before frost, when they are beginning to turn yellow, are much more active and have much more purgative power than those removed in the flowering season, when they are deep green; and he thought that a variation in the period of gathering might account for the difference in the activity of different samples of senna.

Professor Carson presented a specimen, said to be Virgin Scammony, imported from England by Mr. Rushton of New York, which, as a rare article in our market, was referred to Charles Ellis and Edward Parrish for examination.

William Procter, Jr., exhibited a specimen of Valerianate of Zinc, which he had prepared by saturating the water, and the accompanying oil, distilled from Valerian with hydrated carbonate of zinc, filtering, evaporating till a pellicle forms, and setting aside to crystallize. The specimen had a brownish color from its not having been recrystallized, to remove the coloring matter.

William Procter, Jr., called the attention of the members to an idea which he had carried into practice, and which was a sort of combination of maceration and displacement. It was not offered as original, as the same principle had been some years since presented in a plan of making infusions, by Robert Alsop of London, (see *Amer. Journ. Pharm.*, vol. 8,

page 89,) and is also noticed by Soubeiran, (*Traité de Pharm.*, tome 1st, page 72.) It consists in suspending the substance to be exhausted on a porous diaphragm or sieve, near the surface of the menstruum, where, as the particles of fluid in contact with the substance get saturated and consequently heavier, they sink and are replaced by fresh portions, thus producing a circulatory process in the menstruum, which continues until either the substance is exhausted or the fluid saturated.

This plan of operation is occasionally eligible, particularly where the quantity of menstruum is large compared with the bulk of the ingredient to be exhausted. It is peculiarly applicable in effecting the solution of soluble saline matter, as in preparing the solutions for Vallet's proto-carbonate of iron, when haste is not required, and in removing soluble crystalline deposits from bottles by filling them with water and inverting them in the same fluid.



## MISCELLANY.

*Ammonia in the manufacture of Starch, and Farinaceous matters.* By JOSEPH NASH.—I take the liberty to request your publication of the following discovery, which I have made, about three years since, and which I conceive will be found very useful to the public:—

In some experiments which I made on the process of making starch, and preparing farinaceous matters for purposes of food, I found that, for all the purposes of practical operation, liquid ammonia is the best agent for the purpose of dissolving gluten coloring and astringent matters, leaving only the fibre and the starch unchanged, and which, after washing two or three times, may be easily separated by the usual process of straining through a fine sieve, and drying as usually practised. The best degree of strength for use is sp gr. 0.965, and it is superior to caustic soda or potash, as strong solutions of them act powerfully on the starch, while the ammonia produces no change in it, however long it may be kept in operation. It may be applied also in the gaseous way, by passing the ammoniacal gas through refrigeratory apparatus into vessels containing any kind of farinaceous matters, such as wheat, rice, peas, bruised potatoes, or such like matters; and in this case the ammonia from gas-liquors may be used by adding lime and distilling the vapors from them, as it is not necessary to use a perfectly pure ammonia for all the purposes of making starch; but the ammonia may be obtained from any known source. The ammonia, when saturated with gluten, may be obtained again by distillation, and used over again, and the gluten may then be applied to purposes of food, or any other purpose to which it may be found applicable; as an improvement in food it will be found highly useful, as the inferior kinds of rice, peas, and such like matter, after being steeped in ammonia for a few hours, and then well washed, will be found equal to those of the best quality. Close vessels are the best for conducting the operation, and in some cases a low degree of heat may be used without any injury, but it is not absolutely necessary, as the cold operation is sufficient for all practical purposes.

It is also an improvement to add a little ammonia to starch as a finishing process, however the starch may have been obtained, whether by the usual process of fermentation or by the use of dilute solutions of

soda or potash, as it prevents the possibility of fermentation while in a damp state, and dries more rapidly.

P. S. Ammonia will be found preferable to potash or soda in removing glutinous matter from vegetable fibre, for the purposes of woven fabrics, or other manufactures.—*Chemist*.

*On the dosing of Iodide of Potassium.* By A. DUVILLE.—Six months ago I was witness of a fact which proves the high dose in which iodide of potassium may be employed.

If this note appears to you at all interesting to the practice of pharmacy, I beg you to communicate it to the Society (of Pharmacy) of which I have the honor to be one of the corresponding members, and to cause it to be inserted in the Journal which it publishes with so much impartiality.

Towards the end of 1843 I was charged with preparing, for a patient attacked with a venereal bubo in the left groin, an ointment thus composed :—

Iodide of potassium	-	-	-	-	16
Lard	-	-	-	-	30

This ointment was made according to the Codex, bruised on porphyry. It was to be employed in frictions, three times a day, and at the same time the patient had to swallow, also three times a day, lumps of the size of a nut of an antibleorrhagic opiate composed of balsam of copaiba, cubebs and caustic magnesia (to solidify the copaiba.)

By a mistake, which might have been fatal to him, but which will easily be understood, when it is known that the patient was compelled, for certain reasons, to follow up the above treatment secretly, the first friction having to be made at night, he did it in the dark, and used for this purpose the astringent opiate; immediately after he swallowed (I know not how he could have done it) a lump of the ointment prescribed of the size of a muscovado nut. He continued the same mode of treatment, and always in the same error, until the two pots were finished. In this case he did as many patients do, who, in such cases, often exceed the limits of the prescription, in the hope of being more speedily cured, and took the whole in forty-eight hours, (46 grammes of ointment and 64 of astringent opiate employed in frictions.)

Great was my surprise when, after the error noticed, he told me that the bubo had changed its place, and that it was now situated in the middle of the thigh.

I leave physicians to decide whether this is possible, and whether the

patient was really affected with a syphilitic bubo or with a gland of quite another nature.

The fact is, that a new quantity of the ointment, made in the same proportions, but employed this time as it should have been in the first instance, caused this singular tumor to disappear in a few days. When I saw it in the middle of the thigh, it rolled under pressure of the fingers. He assured me that he had not perceived any pain in the epigastrium, nor in other parts of the digestive tube, only he must have had a great desire to be cured, to *masticate*, in some measure, this fat, for which he has since retained a horrible disgust. The opiate, on its part, had caused him to suffer much, by producing the effect of a vesicatory incessantly irritated by rubbing with a cloth, in the angle of the abdomen and the commencement of the thigh.

To sum up: Can 16 grammes of pure iodide of potassium be absorbed by an adult in forty-eight hours, without any accident resulting? This is not my opinion. Then, in this case, however exceptional, was not the fatty body employed in the preparation of the ointment opposed to the entire absorption of the iodide? Did it not form with the gastric juice an emulsion which would pass intact into the chyloferous vessels? Finally, was the deleterious action of medicine averted by a particular cause?

It is for physicians to solve the question already so often put, whether iodide of potassium may be employed in very large doses without danger.

In therapeutics, this medicine is very valuable, and it would be desirable to fix the quantity in which it may be employed.—*Ibid.*

*Camphorated Saponaceous Spirit, or Liquid Opodeldoc.* By GISEKE, of Eisleben.—For several years, this spirit has not only been prescribed by the physicians of Eisleben, under the name of liquid opodeldoc, but it has also been in public demand more frequently than the ordinary solid opodeldoc. It justly deserves to be preferred to the latter, because it is better preserved than in the flasks which contain it, and because it is more easily applied; it may also be more easily associated with other preparations when necessary. The following is the mode of preparing it:—

R White and dry castile soap	-	-	-	60
Camphor	-	-	-	15
Highly rectified spirit of wine	-	-	-	500
Volatile oil of thyme	-	-	-	4
Volatile oil of rosemary	-	-	-	3
Liquid caustic ammonia	-	-	-	30

Mix and dissolve S. A., then filter.

*Ibid.* from *Archiv. der Pharmacie*.

*Ointment of Mercury and Belladonna.* By Dr. MIGNOT.

R—Double mercurial ointment -	-	-	30
Extract of belladonna -	-	-	4
Aqueous extract of opium -	-	-	1
Liquid balsam of Peru -	-	-	<i>q.s.</i>

Mix and F. S. A. an ointment of ordinary consistence, and perfectly homogeneous.

This preparation is indicated in cases of hæmorrhoidal tumors, whose pains it calms with much success.

More or less numerous applications are made according to the cases.

The dose in which it should be employed necessarily varies according to the size of the tumors, on the surface of which it should be applied.—*Ibid, from Jour. de Chim. Med.*

*On a Method of Constructing a Simple Hydrometer.* By EDWARD THOMPSON, Agent of the College of Chemistry, Otley.—Chemists have frequently occasion to determine the specific gravity of a liquid when they have not access to an accurate balance and specific gravity bottle, and druggists may often find it convenient to be acquainted with a cheap substitute for an instrument which, as ordinarily purchased, is either expensive or extremely inaccurate. I think the simple contrivance which I am about to describe, may be found useful under such circumstances. The scientific reader will perceive that it is a modification of an instrument proposed long ago by Fahrenheit:—

Choose a light cylindrical four-ounce phial, and make a mark with a file or diamond completely round the lower part of the neck. Fit it with a bung which extends considerably over the neck of the phial, and which is scooped out on the upper surface in the form of a cup. Then introduce into the phial so much shot or pieces of metal as will float the instrument up to the mark in distilled water, at the temperature of 60°, when a weight of about 500 grains is placed in the cork cup. Now, ascertain the weight of the instrument, including the phial, shot, and cork, and it is complete. When the specific gravity of a liquid is to be ascertained, pour out the liquid into a vessel sufficiently capacious to float the hydrometer, and add weights to the cup until the surface of the liquid exactly coincides with the mark. The specific gravity may then be found by the following proportion:—

As the weight of the hydrometer, added to the weight required to sink it to the mark in distilled water—

Is to 1,000:—

So is the weight of the instrument added to the weight required to sink it to the mark in any given liquid—

To the specific gravity of that liquid.

For example: Supposing that the hydrometer weighs 2,091 grains, that it is necessary to add 431 grains, to sink it to the mark in distilled water, and that when immersed in a certain spirit of wine, 27 grains are sufficient for that purpose; then  $2091 + 431 = 2522$  and  $2091 + 27 = 2118$ . Now as  $2522 : 1000 :: 2118 : 839$ , the specific gravity of spirit.

It is evident that the operation of weighing the instrument and floating it in distilled water, when once accurately performed, need not be repeated, and that afterwards this hydrometer may be used where an accurate balance cannot be obtained.

In Dr. Christison's valuable "Dispensatory," Art. Alcohol, there is a table, by means of which, if it were accurate, we might readily convert the specific gravity, as obtained by this and other instruments, into degrees of Sykes and Dicus's hydrometer, as used by the Excise. But from some experiments I have made, I am led to conclude that the table is not accurate. It is but just to Dr. Christison to observe, that he does not vouch for its correctness, but only introduces it as probably more correct than another which he mentions.—*Ibid.*

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*On Commercial Powdered Liquorice Root.* By M. INGENOHL.—Of late there frequently occur in commerce powdered drugs, which are manufactured on a large scale in Holland and England; at first sight they seem from their external appearance to be very excellent. M. Wichmann recently called attention to a liquorice powder, which has become an object of commerce under the name of *Flores liquiritiz*, which was adulterated with Dutch pink.

Some time ago I had an opportunity of convincing myself that the liquorice powder of commerce frequently contains a quantity of starch, and that on sifting it, small, tolerably hard granules remain behind, which swell in water and partially dissolve. Both the solution, as well as the swollen granules, are coloured indigo-blue by iodine water, which together with their physical appearance, proves them to be *sago*.

Having read the above remark of M. Wichmann, I tested the same powder, which had been adulterated with starch, with muriatic acid for Dutch pink, and in fact it effervesced strongly, and the solution contained alumina and lime.

Such powdered drugs are frequently adulterated and impure, and should not be allowed to circulate in commerce.—*Chem. Gaz. from Arch. der. Pharm.*



*Gowland's Liquor.*—The liquid of Gowland is used against prurigo. The receipt books have published methods of preparing it which cannot be brought about. M. Foy gives the following formula by which a liquid is obtained, which remains perfectly white, homogeneous, and may stand at least twelve to fifteen hours without becoming opalescent:—

R—Emul. of bitter almonds,	-	-	200 grammes.
Corrosive sublimate,	-	-	1 "
Sal ammoniac,	-	-	1 "

Chemist, from *Journ. de Pharm.*

